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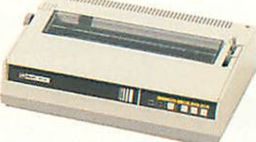
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ACORNUSER

ISSUE No 69 APRIL 1988

NEW USERS

REVIEWS

EDUCATION

REGULARS



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NEW FEATURE


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ViewSheet

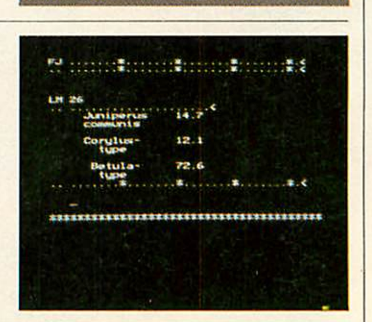
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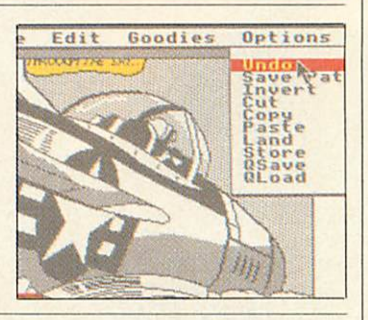
Acorn expert Bruce Smith launches a new series on using applications software with a beginner's guide to *ViewSheet*

FEATURES

Joe Telford's mode 2 graphics program comes complete with a colour dumping routine



Make colour prints with your dot-matrix printer. Dorian Goring shows you how



Reduce the frustration when you type tables in *View* with Colin Ferrington's listing

You can add your own routines to *AMX Super Art* – here's an 'Undo' command and quick saving facility to start with





Electronic mail with no phone charges, claims Interspan. Graham Bell finds out if it's too good to be true

COVER



Illustration by Robin MacFarlan

NEXT MONTH

Arc owners get their own column, Arc Forum, and you get the chance to win one of the new machines, with Compacts for the runners-up. On sale April 14!

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News

News in brief

■ Anyone struggling to transfer their software from BBC to Archimedes will now be able to do so more simply.

An interface is available to enable the connection of a second disc drive internally. The drive can be in either format. The connection is a buffered link to the main internal connector. Problems with drives which do not have the necessary lines to generate the 'drive empty' message are coped with by a simple link change. It costs £25.95 from Dudley Micro Services.



■ The saga of *Graphic Writer* continues with a new, bug-free version available; at least Clares' development team claims to have eradicated all known bugs. While doing this it has thought of a few unrelated improvements to make to parts of the program such as the printer driver. These will eventually be available at £5 to existing users.

■ The scientific wordprocessor *Sci* is proving very popular. Author Peter Voke reckons that there are users in at least a third of the UK's universities, as well as schools and colleges.

The reason for *Sci*'s appeal is that for £29.90 you get a wordprocessor using sideways RAM to present 240 characters on screen, fully WYSIWYG. A new improved version, *Sci 1.2*, is now available from Chessfield Software.

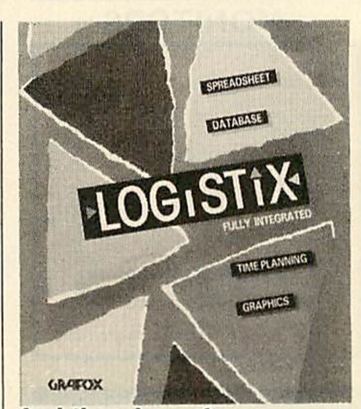
Acorn invests in Arc software

By Carol Atack

Acorn is to put £1/4 million into educational software development for the Archimedes. The company is meeting leading software houses to discuss their proposals for new programs. LEAs are also being approached for ideas.

One LEA, Derbyshire, is cataloguing Arc software.

New MD Harvey Coleman, speaking at January's BETT '88 show in London, agreed that software development was 'fundamental' for the success of the machine. 'But we will not only be supporting educational programs; business software is important as well,' he said.



***Logistix:* serious software**

'By developing software we help the future of our industry. One of the great strengths of the UK is its software and the wealth of computing skills.'

The launch of the Arc without a software base left confused buyers and the machine open to criticism. Of the programs available only two, *1st Word Plus* and *Logistix*, were developed by commercial software houses new to Acorn.

Some have said that Acorn made a crucial mistake in the launch. Coleman disagrees. 'I think mistake is too strong a word. Acorn could have waited for developers, but it was important to get the machine out, to show the new technology. It also gave independent developers time to write programs. I would be concerned about relying on "famous names" to produce software.'

Peartree criticised over 'misleading' advertisement

Peartree Computers has been criticised by the Advertising Standards Authority for advertising a product before it was ready for sale.

The company had been placing ads for an add-on synthesiser, the Music 87, in *Acorn User* and *Micro User* claiming an impressive performance compared to Hybrid Technology's Music 5000.

However several months later, only the hardware had been sent out. The software which gave the Music 87 its claimed improved performance had not been delivered to customers, despite repeated promises.

The ASA judgement expressed 'concern' that the product



The offending advertisement

was advertised before Peartree knew when it would be available. Peartree claimed unforeseen programming difficulties.

Vartan Mundigian of Peartree said that the software was now available and that all Master owners have received their software. But the BBC B version is still not yet completed. None of the readers who sent complaints via *Acorn User* had received the product, preferring a refund.

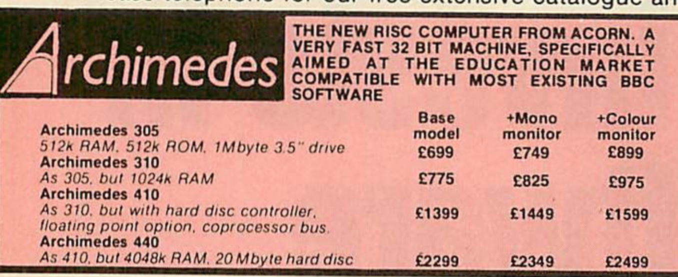
Chris Jordan of rival Hybrid Technology said 'I can't wait for the Music 87 to come out so that it can be reviewed and compared to my system. I'm not surprised they're having difficulties with the BBC version as the Master version uses all 128k of memory. It just won't fit in a model B.'



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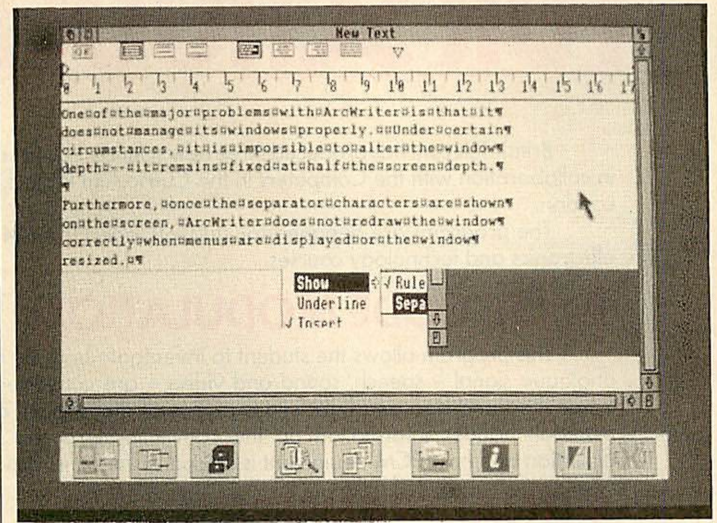
ArcWriter plagued with bugs

Distribution of operating system upgrades and free copies of the *ArcWriter* wordprocessor to early Arc buyers is almost complete.

The finished version 1.2 of Arthur is supposed to clear up all the early operating system and software compatibility problems, but in many cases it has highlighted a bug in the serial port. This is not one, but several bugs caused by differences in serial port controller chips from different companies.

Any attempt to send text or data through the port to printers or modems can result in garbled data.

'We are working on a fix,' said Acorn's Dave Bell. 'Not everyone has problems, though they may find problems arise with Arthur 1.2. We hope to fix it with a software patch which will be ready by the beginning of March.'



***ArcWriter's* windows have major problems**

He advises anyone finding the bug to contact their dealer or Acorn's customer services, who will be able to supply a disc containing the patch free of charge.

ArcWriter, the long-awaited free wordprocessor, has proved on arrival to be riddled with serious bugs. 'We've become aware of a few concerns with it' said Dave Bell. 'They only became obvious in the last two or three weeks. We are looking at correcting them in a future version, scooping them all up at once. Again a replacement disc will be available from our customer services department, with a small handling charge.'

Robin Newman, who has two Archimedes in his school's computer lab, described Acorn's performance as 'inexcusable'. 'It seems as if they have sent *ArcWriter* out without testing it. They're shooting themselves in the foot.

'I've waited a long time for a wordprocessor on the Archimedes but I think I'd rather have waited another month for one that worked.'

School Arcs

The Archimedes has been endorsed for use in South Tyneside's schools. Adviser Laurie Decyk said: 'We've always been a 100% Acorn authority and have lived with that decision to support Acorn.'

This decision to use the Arc is intended to ensure that the BBC standard is maintained through the authority. 'I've heard some horror stories about software portability when authorities have mixed machines' said Decyk.

The authority is a small one, and the machines will be bought when budgets have been allocated at the start of this financial year. But Decyk is aware that any endorsement of the machines could inspire further confidence from potential users and perhaps increase the initially limited pool of software. 'I think a lot of people – certainly colleagues of mine – are waiting before making their choice.'

Micronet set for carve-up

Micronet is set to hive off all non-specialist sections in the biggest shake-up since its launch. And the cut-down computer buff section remaining will seek to expand coverage of machines like the Atari, although the group has denied that this will affect BBC owners, who make up half of the 25,000-user base.

The changes are set for April, but a name has yet to be chosen for the non-computer material.

Among the areas which will be opened up to other Prestel subscribers are Shades, the multi-user game, and the celebrity chatline. The Bizznet section, originally aimed at small businesses, is being renamed and revamped into a personal finance section. Micronet's David Rosenbaum explained: 'We want to promote Shades as an entertainment product, not a computer product. We already get a lot of players through Prestel and we want to increase this. There may still be some overlap on the chatline; it hasn't been finalised. The thing to remember is that Micronet is just one product of Telemap. We will be launching a wide range of new products under the Telemap name which will not necessarily be based on microcomputers.'

Changes to the Micronet section will include an increasing emphasis on popular 16-bit machines like the Atari ST and the Commodore Amiga. Said Rosenbaum 'We have to move with the market. We will retain our coverage of the BBC but we must cover new machines.'

Plotter wins Irish science prize

by Pauline McLernon

Last year's *Acorn User* Exhibition inspired an 18-year-old to win a major prize with a plotter based on a BBC micro.

Matthew Roche pitted his project against 1000 other entrants to come second in an Irish Young Scientist competition – winning £300 and a trip to the US presented by Irish Premier Charles Haughey.

Data from the X-Y plotter can be passed on to a machine tool so a product can be designed and manufactured in one go. Matthew plans to develop the idea to use 3-D designs.

Bell's book



Our new editor, Graham Bell, has gone into print in a big way with a 352-page book on *ViewSheet* and *ViewStore*. It costs £12.95 from Dabs Press.

NEW SOFTWARE PACKAGES FOR SCHOOLS

British Telecom has produced three new science-based software packages for schools in collaboration with the Computers in the Curriculum Project, Kings College, University of London.

The programs are designed for students, aged from 14 onwards, following physics, electronics and technology courses.

PULSE CODE MODULATION

This program allows the student to investigate how, by Pulse Code Modulation, and analogue signal – speech, sound and video – are converted (coded) into digital pulses, transmitted and decoded back into a replica of the original analogue signal. The written material includes information on the conversion process, sampling, frequency levels, distortion and how PCM equipment is utilised in the construction of telephone systems.

SIGNAL TRANSFER

This interactive icon driven program provides students with the opportunity of devising a telephone link, requiring them to set up, transmit and receive a comprehensible signal from one exchange to another.

Users will be able to test the strength and attenuation of signals, incorporate cables, regenerators and exchanges into their telephone link and assess, at any point in time, line loss and signal to noise ratios.

PICTURE MANIPULATION

The program is designed for students to experiment with some of the manipulations that can be made on a video signal once it has been digitised.

The student is introduced to a simplified version of the processes involved, the various ways of altering the information to produce a modified picture and the use of the logical operations such as AND, OR, NOT and NOR as a means of changing colours.



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Chart-toppers Bros do it all by numbers

Top of the pops with a BBC micro

The BBC micro has helped new pop group Bros to achieve No 1 chart success with their first single 'When will I be famous?'. The boys' producer Nicky Graham uses a UMI MIDI system which is based around the BBC and relies on it to synchronise instruments and sound effects.

Lynton Naiff, who developed the system and markets it from his studio in Putney, said 'Most chart records today are put together by producers using computers and samplers. With a system like UMI, the BBC micro can do this just as well as any other computer. For £400 users get all the features that they require.'

This is not the first time that UMI and the BBC micro have helped anyone on to *Top of the Pops*. Vince Clarke of Erasure uses them on all his records and they are responsible for some of veteran Cliff Richard's hits.

Learn with Acorn

Acorn is running a series of courses for computer enthusiasts wanting to know more about their machines.

Courses run for either one or two days. The two-day workshops will be held during the Easter holidays, starting on April 5 and 7. They will be split into four half-day sessions with topics including art on the Archimedes with the writer of *Artisan*, communications with our own David Atherton, and music with EMR's Mike Beecher.

The cost is £138, not including accomodation, which Acorn can arrange for you. Acorn says that if the Easter sessions prove to be successful, they will be repeated in the summer.'

There are also a series of one-day workshops ranging in scope from an introduction to Archimedes software to the intricacies of C. Other days will cover topics like ARM assembler and converting model B and Master software to run on the Archimedes.

These courses cost £69 each. For further details contact Val Raworth, the training administrator at Acorn.

THE COMMS COLUMN

Veteran viewdata host software house Communitel has recently taken its popular software a step nearer to being a Prestel clone with the addition of closed user group facilities. Dominic Wright, technical manager of the firm, told the Comms Column that this was the latest addition after introducing an ADFS version a year ago. This was followed by response frames, an upgraded frame printer and a significantly faster telesoftware formatter.

The latest upgrade is free to users of the ADFS level 2 host and costs £45 as an upgrade for DFS users. Communitel is also developing Archimedes and Nimbus versions of the host software, initially for local (ie, non-modem) access only. Communitel is on 01-960 7988. The viewdata host system is on 01-968 7402.

■ Telecom Gold has opened a demonstration account to show users what the system can do. This has been prompted by the launch of the Amstrad portable computer, and is intended for owners of such machines, but there is no reason why BBC owners intending to use the system shouldn't have a look. To log on to the system dial 01-583 1275 (for 1200/75 baud) or 01-583 3000 (300 baud). When you are connected press Return and then type CALL 84. When a further message is received, type ID AMP999, followed by the password AMSTRAD. Telecom Gold is scrolling system, using seven bits, even parity, one stop bit. Telecom Gold sales are on 0800 200700.

■ Hot on the heels of the Micronet printed magazine *Log-on*, MicroLink has issued its first newsletter, which comes with the monthly bill. Unlike Micronet, bills from MicroLink appear once a month and so does the newsletter. The first issue contains a collection of hints and tips including a new feature, END, which logs you off only if no new messages have been received, unlike the previous BYE which disconnected whether there was a message or not.

■ MicroLink has taken another leaf out of Micronet's book in offering modems for sale. The V21/23 device costs £99, and for a reasonable £169 a V22 (1200/1200 baud) device is available. Both come with *Mini Office* software, which has a comms module. Micronet's V21/V23 modem with Pace *Commstar* software costs £199 but this does include a year's subscription to the Micronet system.

■ Spotlighted bulletin board of the month is Healthdata, the popular health information database run by Dr Chris Dobbing, an east London GP. The system contains authoritative and comprehensive information on all sorts of health and problems, and also provides tips on healthy living. One of the few systems around not devoted to computer topics, it runs on a BBC Econet system with Filestore hard disc, and uses Communitel software. A by-product of the database is that Chris has his home Econetted. You can call Healthdata anytime on 01-986 4360 (1200/75 only, viewdata format). Chris also produces an off-line version of his database for use without a modem and would like to hear from more people who run non-computer oriented bulletin boards and database systems.

David Atherton



RISC USER

We have launched a magazine and support group specifically for users of Archimedes. The magazine provides news, reviews, hints and programs, while the support group gives Technical Advice and 5% discount on our range of Archimedes products. UK subscription is £14.50 per annum.

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Master 128	£250
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Computers must obviously be in good working condition to qualify for this offer.
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PRICES INCLUDE VAT

Where two prices are shown, the first is our full price and the second our members price.

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0558B SKART Lead	10.47	9.95
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0795C 5.25" Archie Disc Lead	25.26	24.00
0796C Serial Link Kit & Disc	18.16	17.25

See next column for details

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Connect up to four external disc drives to your Archimedes with our fully buffered disc drive interface. It fits neatly at the back of your machine and requires NO SOLDERING.

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This kit enables files to be transferred between BBC and Archimedes, in either direction, with the minimum of fuss. The software is menu driven and is fully compatible with DFS and ADFS. The three metre lead simply connects between the serial ports and the software is loaded via the Archimedes.

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1081B ISO Pascal	113.85	108.16
1082B Fortran 77	113.85	108.16
1083B Twin	33.35	31.68
1084B Logistix	113.85	108.16
1086B Prolog X	228.85	217.41
1087B Lisp	228.85	217.41
0900B PC Emulator	113.85	108.16
1095B Artisan	39.95	37.95
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1097B Archimedes Toolkit	39.95	37.95
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0805D CC ROM Podule	56.35	53.53
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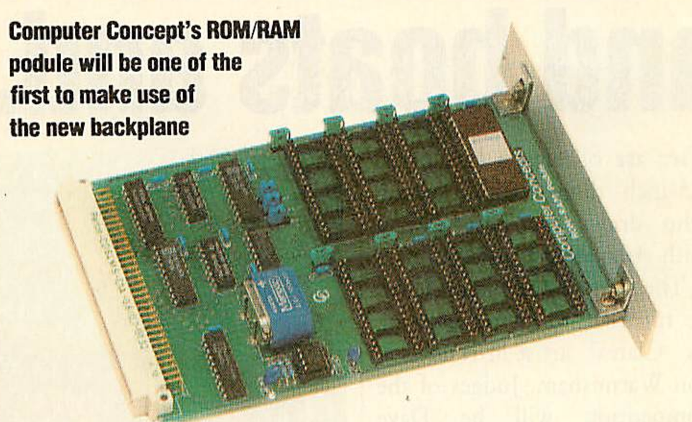
Cheap Arc add-on undercuts Acorn

A small hardware company has launched an Archimedes backplane undercutting the price of Acorn's own. IFEL (Interface Electronics and Computing) is selling the add-on for £35.65. Acorn's backplane costs £44.85

The device is needed for the 300 series to run podules, as the machine's expansion cards are known. So far there are no actual podules available, with Computer Concepts' ROM/RAM podule closest to a firm launch. Marketing manager Steve Picton explained the decision to launch the backplane in competition with Acorn: 'We decided to make the backplane because of the Computer Concepts' podule. The model now available will take two podules but we are hoping to build one which will take four. It is quite a simple piece of hardware; the only real difference between our version and Acorn's is the asking price.

'One reason there are so few podules is that the 32-pin i/c socket needed is very hard to get hold of. But it is necessary for the large memory used by some devices.'

■ Computer Concept's ROM/RAM podule is expected to be the first on the market. It allows the addition of up to 896k of ROM or RAM and is expected to cost £57 including VAT. A battery back-up option will be available.



Computer Concept's ROM/RAM podule will be one of the first to make use of the new backplane

News in brief

■ Cumana has launched a range of high capacity hard discs for any BBC which is fitted with a ADFS ROM chip. The ability to transfer files from ADFS to DFS and back again is one of several utilities included. The prices are £779 for 20Mb, £1149 for 40Mb and £1349 for 56Mb.

■ A new Epson printer driver in ROM form has been released by Dabs Press. Its many features can be accessed within software such as *View* to produce effects which were previously difficult or impossible to achieve. Sub and superscript, NLQ and CRT graphics are among these features. It costs £29.95 for the ROM, a utilities disc and sideways RAM version, plus a detailed manual.

■ If your micro is mouldering away in a cupboard and you need help to bring it back into use, Anthony Kay would like to meet you. His company, Micro Advisory Services, will visit you in your own home. After working out what help you require, private tutorials can be arranged at £25 an hour. The company can also supply a wide range of software and peripherals and can be contacted on 01-878 7044.

Genie family grows

Your *Genie* can now answer even more of your wishes. Permanent Memory Systems has been listening to users of the pop-up utility and desktop system and has added a range of improvements.

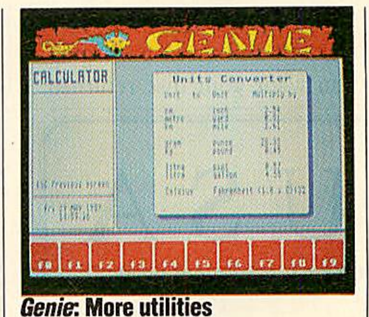
The best bargain on offer is the *Genie* to Psion Organiser transfer program. This was written for the company's managers who claim to be equally addicted to *Genie* and the yuppie toy. They will send you the transfer software for just £2.

For more trend-setting yuppies, PMS is working on a *Genie* to Z88 file transfer program to allow you to exchange data with Sir Clive Sinclair's successful laptop.

For £25 users can buy an extra 32k of RAM which doubles the capacity of *Genie*. Master owners using the cartridge version can add 16k of sideways RAM for £15.

Genie Junior is now available for ADFS, hard disc and RAM disc systems, and a new utilities disc similar to that supplied for the full-scale program is available for £9.95.

■ A clock for the Compact is now available which sits in a ROM socket. Up to four different alarms can be set and the time appears on screen in programs like *Wordwise* and *View*. There is a choice between 12 and 24-hour clocks and the whole thing costs £35 from Permanent Memory Systems.



Genie: More utilities

More Epson fonts

Datathorn Systems has produced a catalogue of downloadable fonts for the Epson GQ-3500 laser printer. Up to eight fonts can be installed at once in the printer. One font and downloading software costs £28.75 with each extra font £8.63 A catalogue is available from Datathorn.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Some of the fonts from Datathorn

Arc is a hit at business show

Acorn's first visit to the business-oriented *Which Computer?* Show was a great success, according to MD Harvey Coleman.

'There was tremendous interest in the Archimedes, and our stand was full all the time,' he said.

Visitors were keen to see the Archimedes 440 running word-processor *1st Word Plus* and the PC emulator.

Trains and boats and. . .

Here are the first winners of the *Artisan* competition run by Clares and *Acorn User*. The railway scene, entitled 'Platform', is by Charlie Harrison from Eastleigh and the futuristic boat 'Sailing on Cygnus 6' was drawn by Keith McAlpine from Birmingham.

Can you do better than these pictures? Clares and *Acorn User* are offering a box of 20 3.5-inch discs to the person who draws the best picture with *Artisan* each month.

The best of the pictures will be turned into an oil painting by Clares' artist-in-residence, Jon Warmisham. Judges of the competition will be Dave Clare, Jon Warmisham and Tony Quinn.

Your entries should be drawn using *Artisan*, and saved using the program's 'screen-save' option. Send your entry on disc to Clares' *Artisan* Competition, 98 Middlewich Road, Northwich, Cheshire CW9 7DA. Include postage and self-addressed packaging if you want your disc returned.


March's winner



Printed from an Integrex colour screen dump

ACORN USER ADVERTISEMENT PAGES – APRIL 1988

BLUNDERBOX

David Spencer has found an error in our Archimedes' windows article from last month which also occurs in the Arc's desktop. In functions which call SWI Poll_Wimp (FNpoll), the mask byte is passed in R0 not in the first byte of the parameter block. So for example, listing 1 should be changed:

```
330 :
340 SYS poll,mask
%,block TO a%
```

The mask allows you not to check for certain types of window event. It doesn't affect the yellow pages program, since the mask is always zero, but may help those writing programs using the window manager.

Also in March, we didn't mention that the MCL control ROM comes from Unilab Ltd.

3.5-inch disc

The monthly listing discs for February, March and April are available on 3.5-inch disc for the Compact, Electron and Archimedes. Send £7.95 to *Acorn User* Monthly Disc Offer, 20-26 Brunswick Place, London N1 6DJ.

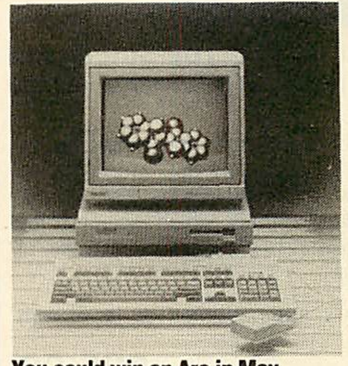
Coming next month in Acorn User

May's *Acorn User* is an artificial intelligence special, and there's also an education theme. It's all change for the regular features, and you can win an Archimedes too!

Next month sees the first Archimedes Forum – vital reading for all Archimedes owners. David Acton will be giving you all the technical help and hints you'll need to make the most of your A305, 310 or 440. And David Atherton will be taking over Hints and Tips, continuing coverage of the Electron, BBC micro and Master series.

The new Step By Step section started in this issue carries on to consider setting up a simple card index of names and addresses with *ViewStore*. Bruce Smith explains it all – step by step.

Micro-Sherlock is a program that thinks for itself, making deductions from information you supply. It's a great introduction to the workings of expert systems and AI languages like Prolog. Joe Telford explains how you can use your BBC to measure temperature.



You could win an Arc in May

In the education section, Chris Drage and Nick Evans conclude their study of hardware and software for those with special educational needs. Dave Marshall takes a long look at the range of databases intended for educational use. And Graham Bell casts an ecologist's eye over the latest Advanced Interactive Video software for the Domesday system – the *Ecodisc*.

May's *Acorn User* also contains our 1988 reader survey. We've an Archimedes 310 plus two Compacts to give away - great prizes to encourage you to send in your replies.

Contact addresses

Chessfield Software, 61 Chessfield Park, Little Chalfont HP6 6RU.
Computer Concepts Ltd, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX. Tel: (0442) 63933.
Cumana, Pines Trading Estate, Broad Street, Guildford, Surrey GU3 3BH. Tel: (0483) 503121.
Dabs Press, 76 Gardner Road, Prestwich, Manchester M25 7HU. Tel: 061-773 2413
Datathorn Systems Ltd, George House, 50 Spring Grove, Loughton, Essex IG10 4QD. Tel: 01-508 4904.
Dudley Micro Services, 30 Hadley Close, Netherton, Dudley DY2 9JX Tel: (0384) 633142.
H S Software, 56 Hendrefoilan Avenue, Sketts, Swansea SA2 7ND. Tel:(0792) 204519.
Interface Electronics and Computing, 36 Upland Drive, Plymouth, Devon PL6 6BD. Tel: (07555) 7286.
Those Engineers Ltd, 106a Fortune Green Road, London NW6 1DS. Tel: 01-435 2771/3757.

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Please note: debugging readers' programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

We will answer the problem and return all material received – within a guaranteed 10 working days from receipt. If we fail to match this promise then your cheque or postal order will be returned with the answered question – you can't lose!

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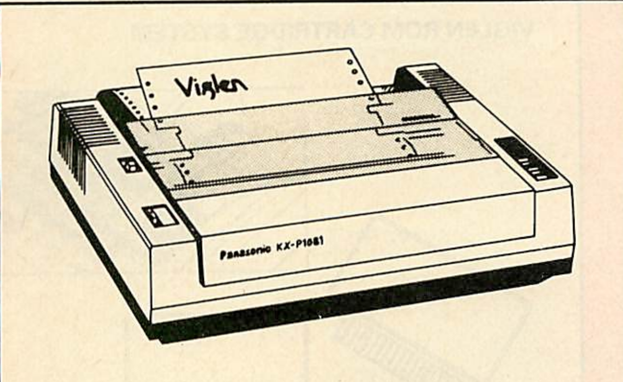
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The Panasonic KX-P1081 come complete with £45.00 worth of accessories FREE including tractor feed and roll feed units with paper, printer cable, and a specially designed metal printer stand.
Features include:

★ 120 cps draft printing 24 cps NLQ
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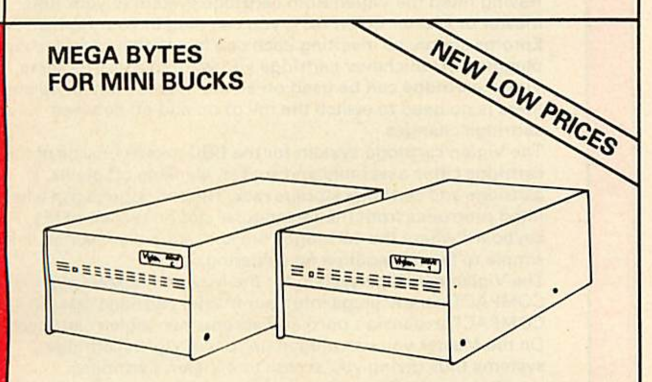
Stock Code	Description	Price inc. VAT
SP079	Panasonic KX-P1081 plus accessories	£185.95

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WINCHESTER

MEGA BYTES FOR MINI BUCKS

NEW LOW PRICES



Plug in 20 to 112 Megabytes of extra storage with the Viglen Winchester system.
The Viglen Winchester is ready to plug in and use on a BBC Master micro; for a BBC B or B plus you will merely need to fit the Acorn ADFS Rom. The Winchesters are 100% compatible with the Acorn Winchester and Acorn ADFS and will also work with the Acorn Master 512 board with DOS plus.
Drive 1 Winchesters are also available for backup or just more storage and simply plug into the back of the Drive 0 unit.
The Winchester package consists of: Winchester unit (cased with controller boards, power supply and fan), Master reference Manual part 1, Winchester user guide and Winchester utilities on disk (such as formatter, verifier, ADFS menu and sophisticated backup program allowing you to make fast backups on DFS disks, ADFS disks or Drive 1 Winchester).

Stock Code	Description	Price inc. VAT
Drive 0 Single		
SP0150	VB20 20Meg Viglen Winchester	£499.00
SP0152	VB28 28Meg Viglen Winchester	£519.00
V155	VB40 40Meg Viglen Winchester	£799.00
V156	VB56 56Meg Viglen Winchester	£899.00
Drive 1 Second Drive		
SP0160	VB120 20Meg Drive 1 Winchester	£479.00
SP0162	VB128 28Meg Drive 1 Winchester	£499.00
V165	VB140 40Meg Drive 1 Winchester	£739.00
V167	VB156 56Meg Drive 1 Winchester	£769.00
V157	20MB Tape Streamer Backup	£689.00
V503	Acorn ADFS Rom and Manual (Only necessary for BBC B or B Plus)	£29.95

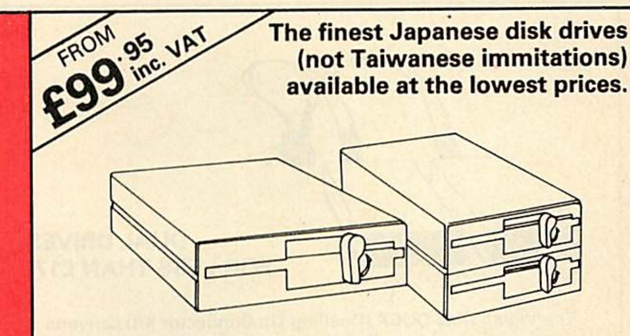
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Available for use with SJ research file server at no extra cost, please specify when ordering.

DISK DRIVES

FROM £99.95 inc. VAT

The finest Japanese disk drives (not Taiwanese immitations) available at the lowest prices.

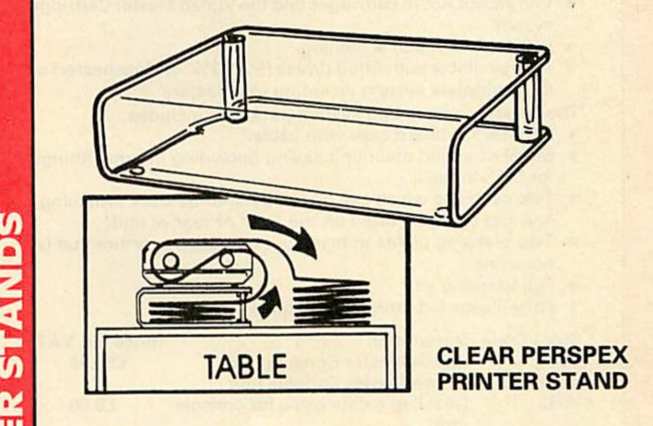


All disc drives are supplied with a manual, packed utilities disc and a full 12 Months warranty (2 Year Warranty available) and are ready to plug in and use on a BBc B (fitted with a DFS) B + or Master micro. 40/48 Track drives have a switch which enables operation in either 40 or 80 track mode.
The capacity quoted are given in single density mode; for double density mode (1770 DFS + ADFS as in the Master) the capacities should be approximately doubled.
An integral power supply is not necessary as the disc drives run from the micro's power source however should you require drives with their own power supply, these are also available.
If your BBC B micro does not have a DFS fitted then you will also require the Acorn dfs kit. These are available from Viglen.

Stock Code	Description	Price inc. VAT
SP014	400K Single Drive 40/80T	£99.95
SP030	400K Single Drive 40/80T + PSU	£109.95
SP019	800K Dual Drive 40/80T	£189.95
SP020	800K Dual Drive 40/80T + PSU	£209.95
VPD0240	100K Single Drive	£105.95
VPD0241	400K Single Drive 40/80T	£113.00
VPD0242	200K Dual Drive	£195.95
VPD0243	800K Dual Drive 40/80T	£219.00
VPD0245	100K Single Drive + PSU	£119.95
VPD0246	400K Single Drive + PSU	£135.00
VPD0247	200K Dual Drive + PSU	£209.95
VPD0248	800K Dual Drive 40/80T + PSU	£235.00
VPD0249	800K Dual Drive 40/80T + PSU in Metal Bridge Unit	£265.00
V0060	3.5" 400K Single Drive	£95.95
V0061	3.5" 800K Dual Drive	£199.95
V0062	3.5" 400K Single Drive + PSU	£135.00
V0063	3.5" 800K Dual Drive + PSU	£199.00
V0064	3.5" and 5.25" 800K Dual Drive	£219.00
V0065	3.5" and 5.25" 800K Dual Drive with PSU	£249.00

Please add £8.00 for insured courier delivery.

PRINTER STANDS



CLEAR PERSPEX PRINTER STAND

The Viglen printer stands are beautifully finished in clear perspex and raise the printer high enough to put continuous stationary underneath.

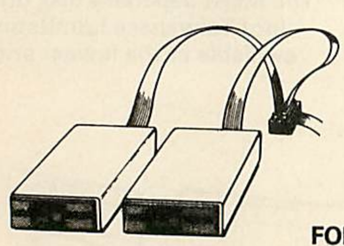
Stock Code	Description	Price inc. VAT
V490	80 Column Printer Stand (15" × 13" × 3.5")	£19.95
V491	136 Column Printer Stand (23.5" × 13" × 3.5")	£29.95

Please add £3 P & P

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SPECIAL OFFERS FROM VIGLEN

DUCKS



DUAL DRIVES FOR LESS THAN £17!

The Viglen Data DUCK (Dualling Up Connector Kit) converts any two single drives to a dual drive instantly. Simply plug the duck into the micro's disk drive socket and plug two single drives (any type and any make) into the duck to obtain a dual drive system accessed as drive 0 (and 2 if double sided) and drive 1 (and 3 if double sided). If neither single drive has its own power supply then you will require a Viglen power DUCK in order to obtain two disk drive power sockets from the micro.

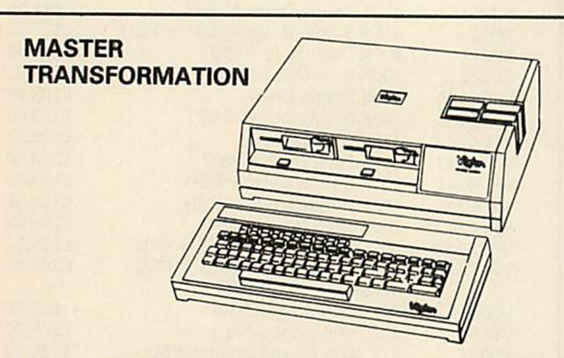
★ No soldering simply plugs in.
★ No need to take disk drives apart to change links.

Stock Code	Description	Price inc. VAT
V084	Viglen data duck	£16.95
V085	Viglen power duck	£7.95

Please add £2.50 for P & P.

CONSOLE SYSTEM

MASTER TRANSFORMATION



Give your BBC Master micro the professional PC look by replacing your existing lid with this smartly styled package. The system is strong and constructed in high impact ABS colour matched to the BBC Master and it gives your Master a very neat and impressive look.

★ Will support monitors including up to 16" TV.
★ Can house two 5¼" disk or Winchester drives.
★ Capable of housing 3½" drives.
★ Will accept Acorn cartridges and the Viglen Master Cartridge system.
★ Full internal metal screening.
★ Also available with fitted drives (5¼", 3½" or Winchester) or as a complete system including the Master.

The Master console unit system packages includes:

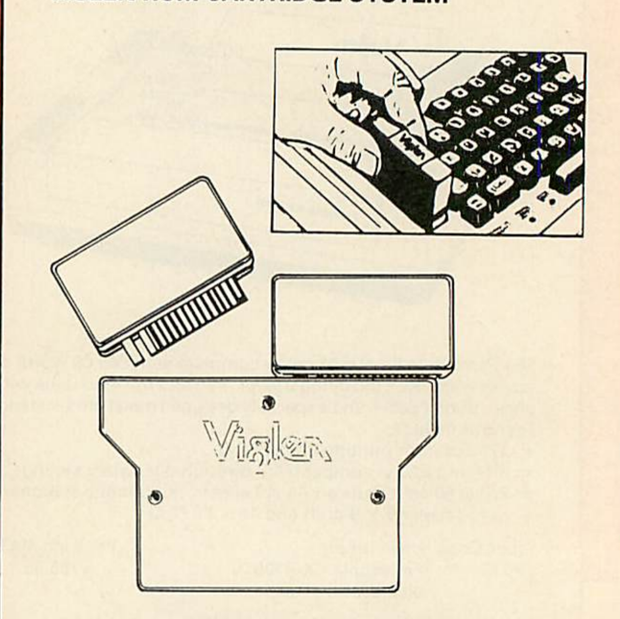
★ Remote Keyboard case with cable.
★ Metal screened main unit casing (including internal fittings for 5¼" drives).
★ Two switches which can be used for 40/80 track switching and can be either fitted on the front or rear of unit.
★ Two blanking plates to blank out any drive aperture that is not used.
★ Full labelling kit.
★ Fully illustrated fitting instructions.

Stock Code	Description	Price inc. VAT
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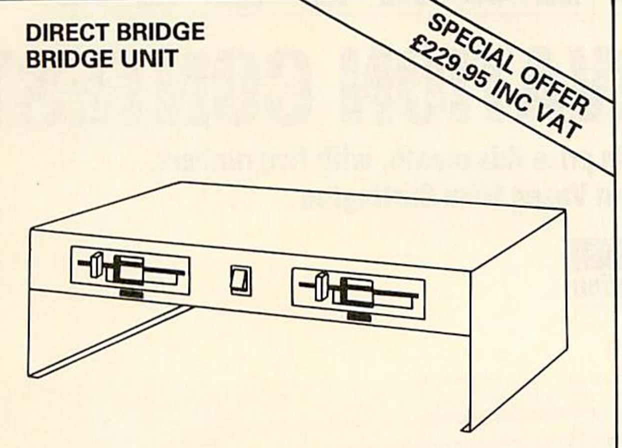
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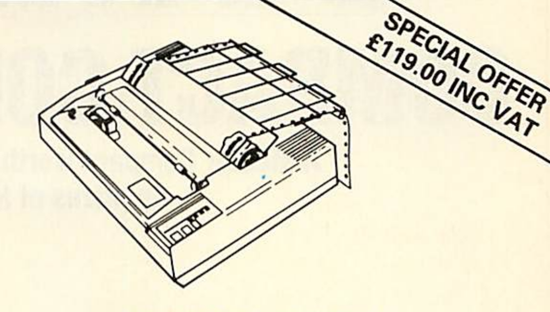
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COMPETITION

COMPACT CONSERVATION CONTEST

A Master Compact worth £400 is the main prize this month, with five runners up prizes of lead crystal Acorn Vases from Dartington

Tony Quinn

Not only can you do yourself some good in this month's competition – by winning a Master Compact worth £400 – but you can also help keep Britain beautiful.

One of the organisations in the forefront of the fight to improve the environment, and repair the damage done by the recent storms, is the British Trust for Conservation Volunteers. We've got together with the Trust, which is a charitable body whose patron is the Duke of Edinburgh, to compile this month's competition.

And readers who belong to Micronet can dial into a special Celebrity Chatline in March with people from the Trust when an extra part of the competition will be announced live on the air with extra prizes. People who enter this part will also automatically donate 20p to the BTCV when they enter by accessing a certain page number (if you want to donate more you can always log on to it several times).

There are three parts to entering:

- Figure 1 is a computer-generated word grid in which are hidden the names of several trees which grow in Britain. All you have to do is find them! They can be written up, down, across, backward or diagonally across the grid, in a straight line.
- One of the last major surviving areas of heathland in Europe lies around the Ashdown Forest in Sussex. Which great literary character, who did not lay claim to great intelligence, had his home based on this forest?
- On April 25-28 the BTCV is organising a Great Worm Hunt as part of the ITV charity Telethon. London schoolchildren will be sponsored to collect worms which will be taken to sites in the city where the soil quality is poor. What we want to know is how many worms you could find in an area the size of a football pitch. Are there about:

100,000? 1.5 million? 10 million?

Write the names of the trees, the character and the number with your name and address on a postcard or sealed envelope, stick on the coupon below and send it to: April Competition, *Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Judging will be on May 24.



V	V	M	Q	M	W	Y	W	P
J	C	A	A	I	B	A	C	R
H	S	V	L	C	I	S	E	O
S	O	L	D	H	R	P	L	J
A	O	H	E	E	C	E	P	B
W	Q	I	R	R	H	N	A	E
O	W	C	U	R	W	M	M	E
G	O	A	K	Y	A	K	O	C
X	M	A	E	B	N	R	O	H

Figure 1. Find the tree names

ACORN USER
COMPETITION
APRIL



Free copies of the *Emergency Tree Pack* are available from *Acorn User*, and a second pack of 10 booklets called *Conservation in School Grounds* costs £2.95 inclusive (cheques payable to BTCV please). The 10 booklets cover topics ranging from planting trees to building a pond.

London schools interested in taking part in the Great Worm Hunt should contact Tim Boote at BTCV, 80 York Way, London N1 9AG.

BTCV will be one of the beneficiaries of ITV's charity telethon on May 29 which may feature a film on the Trust.

If you would like to join the BTCV, write to them at 36 St Mary's St, Wallingford, Oxon OX10 0EU. Membership costs £10 a year.

"£229 for all that?"

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ACU4

EDUCATION

NEWS

Wordprocessors on the way for the Arc

Acorn is holding back delivery of its basic wordprocessor *ArcWriter* until upgrades of the operating system ROMs have gone out.

ArcWriter only works with the later 1.2 version.

Schools still waiting for the arrival of either operating system or wordprocessor should check that they have sent in their registration card. Failure to do so means loss of entitlement to upgrades.

■ Clares Micro Supplies have now released *Graphic Writer* which allows the integration of text and graphics on the same page. Several documents may be stored in memory, which is useful for transferring information easily between, for example, chapters of a book. Graphics may be created using the program's own editor or imported from other sources.

■ *First Word Plus*, an advanced package costing £100, is set for release soon, having being converted for the Arc from other machines. Acorn marketing manager Bob Coates has claimed this popular package runs faster than on other micros and features a spelling checker which works as you are typing.

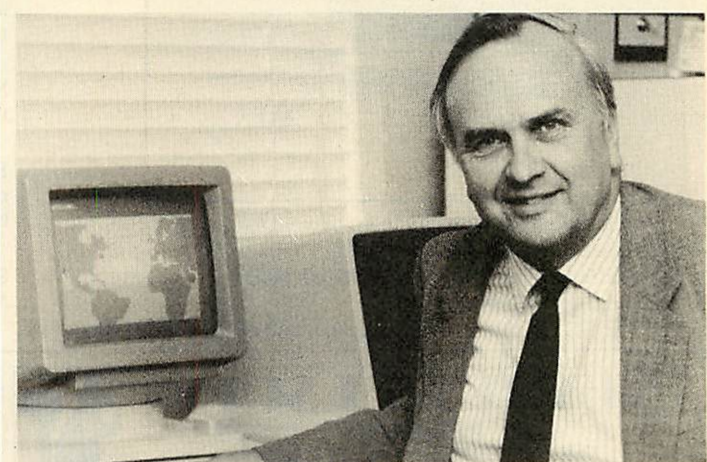
■ Acorn does not plan to produce a 'definitive' wordprocessor, as it did with *View* on the BBC, so as not to discourage software development by other companies. This is a major reason why *View* was not bundled with the Arc.

MESU & CET merged in surprise move

By Nick Evans

The sudden announcement that the Council for Educational Technology and the Microelectronics Education Support Unit are to be merged has taken both bodies unawares.

In an initial response, MESU chairman Mike Nichol said: 'I hope the new body will build on the strengths of both units and especially the strategy built up by MESU of taking the advice of the initial teacher training institutions and LEAs'.



John Foster: MESU chief tipped for top job

The new umbrella body is to be called the National Council for Educational Technology and is likely to be based in Coventry – the present home of MESU. This has disturbed staff at CET in London who see themselves disappearing into MESU in all but name.

The move has been made by the DES to create a multidisciplinary body which will have a broader role than either organisation. There was a significant amount of common ground in the two briefs and amalgamation was seen as a way to improve efficiency.

The main modifications are to the CET's remit which covers all of the UK and tackles many areas not so far dealt with by MESU. Organisations like the SMDP in Scotland will be interested in the new relationship because their responsibility was previously only to the CET. None of MESU's initiatives have so far affected Scotland or Northern Ireland.

The post of chief executive of NCET has been advertised and the new incumbent will start on April 1. The person tipped for the job is John Foster – present head of MESU. The director of CET, Richard Fothergill, quit last year in a move widely regarded as the result of strong disagreements with the DES.

Last reference made

Jim McHugh, compiler of the *Magazine Bibliography*, is giving up the task of gathering together references from numerous magazines, including *Acorn User*, after six years. The entire bibliography covering December 1981 to October 1987 runs to 1.6Mb of data with 24,230 references. Rapid search routines allow the entire set of information to be searched in five minutes.

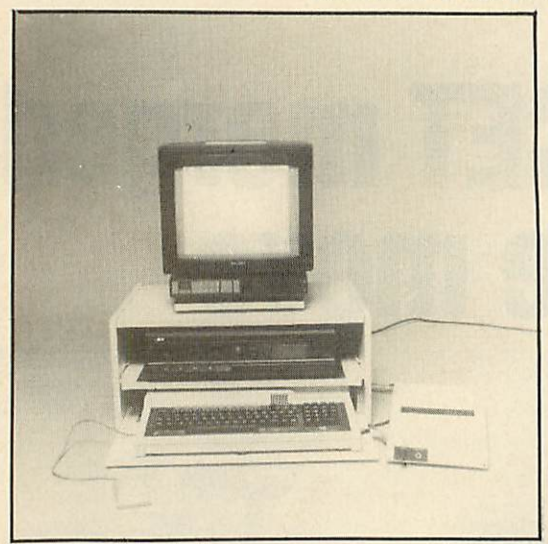
The bibliography began life as a personal utility but rapidly grew into a cottage industry. Jim's job as a head teacher now prevents him spending the time needed. The 18 parts of the biography cost £8 each.

Compact Lego

Compact users have been unable to use the *Lego Lines* system because of a lack of an ADFS version of the software. But now registered users should apply for a 3.5-inch disc version for a small upgrade price, or contact Lego by telephone for details of modifications to the programs.

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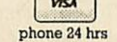
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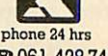
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Hardware confusion grows at show

By Carol Atack

Visitors to the BETT '88 show saw evidence of the growing integration of computers and technology into education, with a wide range of programs reaching into every subject area. However, there was also a lack of clear direction in the bewildering choice of hardware companies were eager to place in schools. Advisers and teachers crowded round stands from Research Machines, IBM and Apple.

The traditional staple of these shows is software for the BBC micro, and there was plenty of this. Simulations are, it seems, ever more popular and some go to great lengths to achieve realism. Cambridgeshire Software House launched a new simulation of the discovery of the Tudor warship Mary Rose. The company invited diver and archaeologist Margaret Rule on to its stand to describe her real-life experiences depicted in the program.

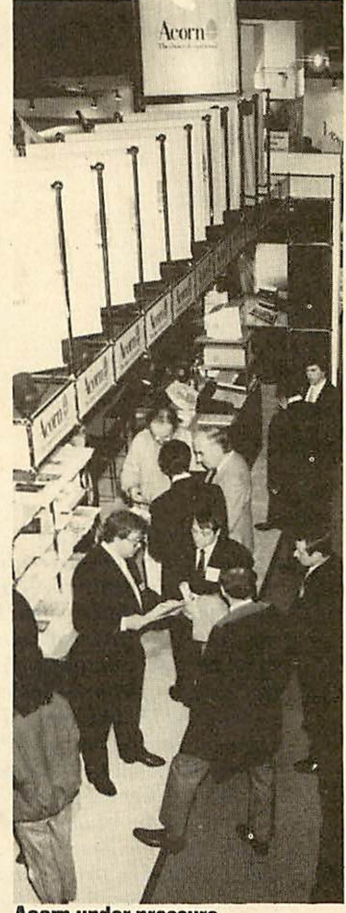
Stalwarts of the educational software scene Fernleaf and SPA also released simulations. Fernleaf's *Hereward the Rebel* takes children into the last pockets of resistance against the 11th-century Norman invaders. SPA's *Blind Watchmaker* offers a graphic simulation of the processes of evolution. Acorn's Australian distributor showed a simulation of outback life, *Bush Rescue,* where an ordinary camping trip goes wrong.

The show also presented a useful round-up of Archimedes software, and introduced some new programs. Minerva Systems concentrated on its wide range of Archimedes programs, such as *Deltabase*. Logotron introduced a powerful version of Logo for the machine. The show was also the first opportunity to see the Archimedes 440 machines, which Acorn showed running early versions of the *First Word Plus* word-processor. Acorn's announcement of £250,000 of funding for Archimedes educational software development could not have been better timed to reassure potential buyers.

However announcements by Acorn could not disguise the fact that other manufacturers had a strong presence. Apple's well thought out stand allowed anyone interested to sit there and play with particular applications. *Hypercard,* the highly interactive database, proved particularly popular.

Research Machines showed off their latest AX and VX series IBM-compatible machines, which are selling well in the business market.

IBM's own stand was small, and offered just a taster of the service it plans to offer schools. But the ranks of networked PS/2 computers running American educational software attracted some interest.



Acorn under pressure

Contacts

Acorn; 645 Newmarket Road, Cambridge CB5 8PD.
Apple; Eastman Way, Hemel Hempstead HP2 4BR.
Fearnleaf; 31 Old Road West, Gravesend DA11 0CH.
Lego UK; Ruthin Road, Wrexham LL13 7TQ.
McHugh Enterprises; 43 Hookstone Oval, Harrogate HG2 8QL.
Mercury Educational; PO Box 194, Sevenoaks TN15 8TZ.
Minerva Systems; 69 Sidwell Street, Exeter, Devon EX4 6PH. Tel: (0392) 37756.
SPA; PO Box 59, Leamington Spa CV31 3QA.
Topologika; PO Box 39, Stilton, Peterborough, Cambridgeshire PE7 3BR.

Varied software from Topologika

Topologika is following up its first educational package – *Giantkiller* – with three very different sets of school materials, *Polyominoes*, *Curves* and *Punctuate!*

The first, for £18.40, is 'designed to promote investigations of the properties of polyominoes, and consists of programs to allow pentominoes, hexagons and a carousel display system as well as a printing utility.

Curves (£29) for GCSE work, is a cross-curricular pack produced jointly by Topologika, EARO and mathematics specialists Leapfrogs. It comprises disc, 200 page book, teacher's and pupil's guides and a story tape.

Punctuate! is an apparent attempt to retrieve the loss of the *Puncman* programs which were left with Chalksoft when Topologika's Brian Kerslake split away from the company. *Punctuate!* (£14.95) is designed to help anyone who has trouble with punctuation. The program prints text on screen with a selection of punctuation marks removed. These must be replaced, and the child has a limited period to do it.

Primary DTP

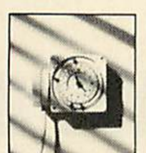
The fifth pack in the *Micro at Work* series from Granada Educational Software is now available. *Newsdesk* is a desktop publishing package aimed at the primary school and recommended as an adjunct to the *Read All About IT!* programme broadcast on February 19 and May 20.

The software presents pupils with a pre-designed grid onto which stories from word-processors and pictures from graphics packages may be inserted. These may then be printed out on a dot-matrix printer as one complete page.

Newsdesk costs £14.89. Details are available from Mercury Educational.



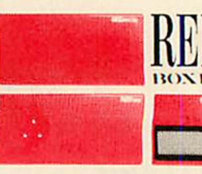
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EDUCATION

SOMETHING SPECIAL

Hardware like the Concept Keyboard gives special needs kids the chance to use the micro. But what software is there?

[redacted]

Chris Drage and Nick Evans

Last month's *Acorn User* examined some of the software for special educational needs which uses the Microvitec Touchscreen. This month we look at materials for the Concept Keyboard, and at some other devices from Elfin Systems.

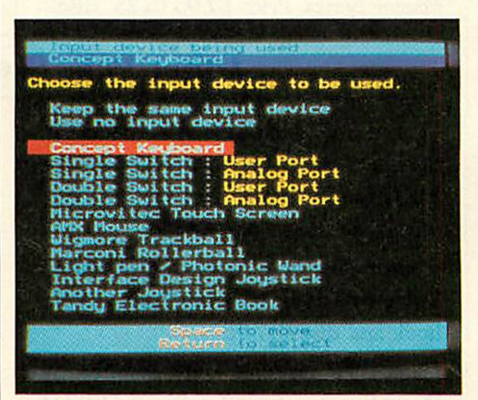
The Warnock Report concluded that pupils who had formerly been relegated to the special needs department – because of mental or physical handicap or social, educational or emotional deprivation – should be brought back into the mainstream of teaching. Gearing up the ordinary primary and secondary school teacher to be able to cope with this situation involves a high level of training and support. In many schools this has not yet been achieved. The special needs teacher has often become an internal adviser – helping colleagues to provide equal educational opportunities for disadvantaged pupils.

Although the computer has long been recognised as a useful resource for children with special needs, lack of funding has restricted its use. Ideally each pupil would have a computer of his or her own. But in reality, there is unlikely to be even one machine per subject area in a normal secondary school. The situation in primary schools is no better. Consequently the one-to-one teaching that some pupils – especially the severely physically and mentally disabled – require is not available, because computers have to be used by the whole school. Of course, there are exceptions. Some authorities or particular schools within LEAs have made specific provision for pupils with special needs, but this is far from widespread, and it's often not even recognised as an aim.

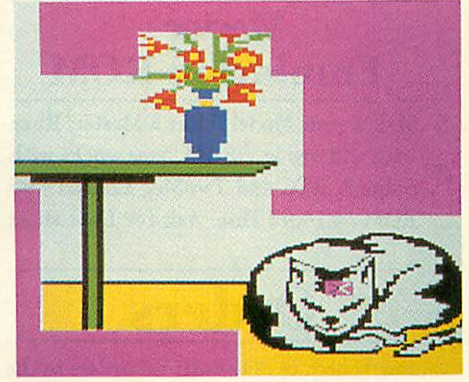
The lack of a national policy towards computers in special needs teaching does not help. The four Special Education Micro-electronics Resource Centres (SEMERCs), at Bristol, Redbridge, Manchester and Newcastle, were under threat for some time, and now they have been given secure funding only until the end of March 1989. After then, their roles will be devolved to the local education authorities. In reality, only those authorities which have sufficient funding or interest will continue the work.



Getting away from the QWERTY keyboard opens up the micro to very young children



Good software gives a choice of input



***Window* reveals parts of a picture**

As reported in February's Education News, Oldham's local authority has committed itself to providing support, but how many other authorities will follow suit is open to speculation.

Despite this background of confusion and lack of provision, both MESU and the various SEMERCs are publishing a variety of materials which are either free 'Blue Folder' packs, or cost very little.

Most of this software utilises the Star Microterminals Concept Keyboard and comes with A3 and A4 overlays. One such program is *Window* published by MESU. This is a 'framework' program which allows parts of a picture to be gradually revealed. The picture is divided into squares and these can be 'uncovered' one at a time to reveal a part of the total picture. They may then be either covered up again or left open so that the picture builds up slowly. The program aims to develop a childs' inferential skills in both individual and group work.

Click, from the Manchester Special Needs Software Centre, is also a

DABS PRESS NEW RELEASES

HyperDriver

The ultimate printer driver for Epson-compatibles offers eighty (yes, 80!) easy-to-remember mnemonic star commands which control every aspect of the printer from View, Wordwise Plus, Interword, BASIC and any language which accepts star commands. A special printer driver in the ROM is loaded for View which of course supports microspacing. The ROM allows test printing to screen, with full screen effects (bold, underline, condensed, italic, super/subscripts), a CRT graphics mode where characters are printed from BBC definitions, and a full 3-pass NLQ font so you can have NLQ even if your printer doesn't normally have it.

A packed 100-page manual takes you through all the features, which we can't begin to describe here—please send for our detailed leaflet. Also a utility disc is included with many example files.

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SideWriter

Does your keyboard disappear under a mound of notepaper, as you forever make notes which don't really fits into what you're doing at the moment.

Sidewriter is a pop-up notepad which resides in your Sideways RAM giving you a scrolling screen of 128x76 characters. No matter what you're doing, press CTRL-SHIFT-TAB to enter SideWriter, and when you've made or consulted your note, press TAB and you'll return instantly to where you were.

Commands exist to save, load, clear, and print the pad contents, which deal with the various types of Sideways RAM on the Model B and Master Series.

Possible uses include:

- Programming notes
- Keystrip information
- Taking telephone notes
- Information eg, price lists
- Directory of mailbox numbers
- Game keys
- Adventure locations

The SideWriter data can also be exported into most wordprocessors. For the BBC B/B+ with Sideways RAM, and Master Series. Price £7.95 (5.25" disc)

MOS Plus

MOS Plus is an invaluable ROM for Master 128 owners. Unlike most ROMs this one is not for programmers, but for the ordinary user. It fixes the notorious *CLOSE and *EDIT bugs in DFS, enhances many of the standard Master commands, provides some new ones, and contains a complete alarm clock system, and extra *HELP options.

The extra commands include *FIND, which will find any file on an ADFS disc, *SRKILL to wipe banks of Sideways RAM, *SETTIME to set the clock when not in BASIC, and *BLIST to list a program without loading it.

*FORMAT, *VERIFY, *BACKUP, *CATALL and *EXALL mean that you no longer need to use the Welcome disc for these essential operations. *BACKUP is improved to optionally use Sideways RAM for storage reducing swaps for single drive users, (without corrupting main memory) and Side 0 can now be copied to Side 2 on another disc.

The Alarm system will ring at a specified time and survives power-down. For the Master 128 only, price £12.95 ROM, £7.95 5.25" disc.

Other Dabs Press favourites

View: A Dabhand Guide by Bruce Smith. Complete tutorial and reference for the VIEW wordprocessor. New edition. Book £12.95 Book and disc £17.95

Master Operating System: A Dabhand Guide by David Atherton Book £12.95 Book and disc £17.95

Fingerprint machine code monitor by David Spencer. Includes disc and SRAM versions £9.95

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ViewSheet and ViewStore: A Dabhand Guide by Acorn User Technical Editor Graham Bell. NOW AVAILABLE. £12.95 book. £17.95 book and disc.

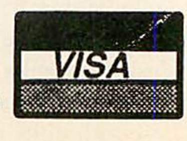
C: A Dabhand Guide by Mark Burgess. Complete guide to C programming applicable to BBC and Archimedes C. £14.95, £19.95 with disc. Due May 1988

Archimedes Assembly Language:A Dabhand Guide by Mike Ginns Due Spring '88



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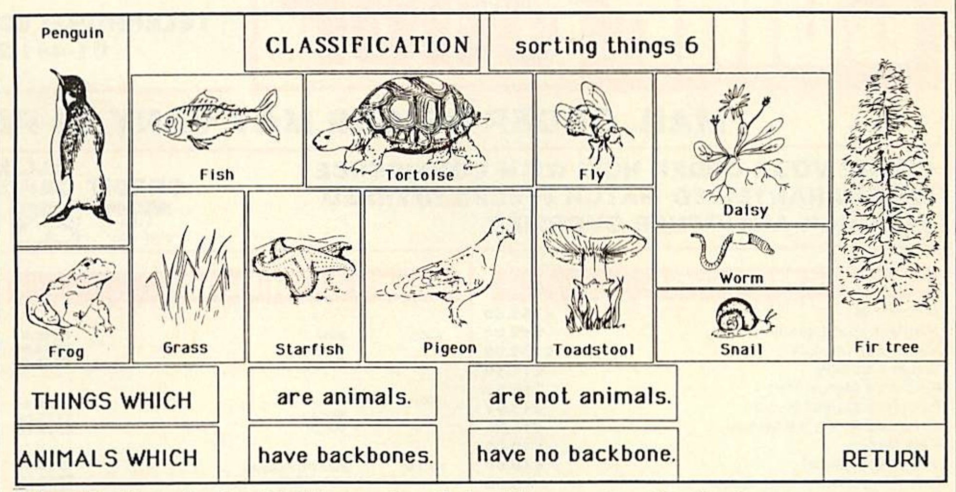


framework program which at first sight seems similar to MESU's *Window*. However, it can adopt a slightly different approach. The picture is hidden behind a grid, and parts of the picture are revealed, one grid reference at a time. But in addition, a piece of text can be linked with the grid 'cell'. The program may then give clues about other cells, provide directions to the next cell to look at, or just display a commentary on the cell's contents. Your own pictures can be created using the package's drawing facilities, or images may be imported from other packages. Even digitised pictures can be used.

A good package for special needs, and indeed for general use, will allow different input devices to be used to control the software. In fact *Click* works with a mouse, Trackerball, Concept Keyboard, and joystick as well as a conventional QWERTY keyboard.

Another Manchester Special Needs program is *Animal Pack*, which is designed to assist the exploration of the scientific classification of animals in secondary schools. The package takes existing, well-tried resources, and adapts them. This has a number of advantages over developing software from scratch. The first is that teachers and pupils are already familar with the basic method of operation of the packages. The second is that the programs have already proved themselves to be robust and educationally sound. Tailoring them merely gives them a more specific directon.

Animal Pack takes *Prompt-3*, *Touch Explorer*, *Animal*, *Developing Tray*, *Lists*, and *List Explorer* and then gradually introduces the concepts behind zoological classification. The children are shown how to identify fundamental differences between animals, and how to structure that information. They provide lists which eventually grow into a database of classification. *Prompt-3* and *Touch Explorer* are widely used, especially in the early stages, but the level of difficulty rises steadily as the pupils tackle progressively more complex tasks, eventually leading to simple database work. The materials for this package are very well-presented, and yet are simple and cheap to reproduce. It was considered important that overlays and software should have a professional appearance which matched that of the conventional textbooks and materials used in the science laboratory. The materials are not designed to be a self-contained unit, but are aimed at complementing the normal classroom resources. They could be used in conjunction with videos, school visits and so on in the normal school year.



***Animal Pack*'s professional-looking overlays tie in with conventional textbooks**

The above-mentioned packages are some of the most recent releases from the SEMERCs. They involve a great deal of work on the part of many individuals, who usually gain no recompense other than the knowledge of a job well done. It is perhaps for this reason, and the fact that they are so inexpensive, that teachers often undervalue this type of material. There is a wealth of software freely available and copiable from SEMERCs, and your LEA computer centre will have copies and may even be able to reproduce them for you at a small charge. If you have problems then write to your local SEMERC or to Peter Fowler, special needs co-ordinator at the MESU in Coventry.

Finally in this article, we will look at a range of materials from Elfin Systems. They produce several highly sophisticated devices which have been well received in special education circles.

Their scanning keyboard uses a display board on which letters and numbers are illuminated in sequence. When the one which the user wants is lit up, they press a switch. It enables disabled people, who cannot use a conventional keyboard, to have access to the micro.

Related to this keyboard is the fascinating *View Antics* package. The user types the beginning of a word and as soon as the micro recognises a match from a list of words in its memory, the whole word appears on screen. Typing in additional letters changes the possible selection. The package also inserts automatic spaces after punctuation, u after q and capital letters at the beginning of sentences. It certainly speeds up typing, and reduces the frustration often felt by the physically handicapped. This leads on to another useful piece of software – *Unikey*. Until you begin to think of the problems that a disabled user has in operating a computer, it easy to forget that, for example, the normal use of the Shift or CTRL keys might be impossible if you are typing using a head wand. *Unikey* allows the user to press the shift or CTRL key *followed* by the next letter, to achieve the same effect as pressing them together. This opens up sophisticated packages like the *View* wordprocessor.

Probably the most exciting device Elfin produce is the 'My Voice' human speech synthesiser. My Voice digitises up to two minutes of speech or other sounds in one or two second units. A keystroke replays the digitised phrase, allowing the user to 'speak' without sounding like a robot. It can be used with a scanning keyboard or, via the BBC micro, with a Concept Keyboard. Also, it can be used in adventure games add speech and sound effects.

Next month we will look more closely at uses of the Concept Keyboard in the mainstream of the primary school.

MESU, Science Park, University of Warwick, Coventry, West Midlands CV4 7AL. Tel: (0203) 416994.
Bristol SEMERC, Bristol Polytechnic, Redland Hill, Bristol, Avon BS6 6UZ. Tel: (0272) 733141.
Manchester SEMERC and software centre, Manchester Polytechnic, Hathersage Road, Manchester M13 0JA. Tel: 061-225 9054.
Newcastle SEMERC, Newcastle Polytechnic, Coach Lane Campus, Newcastle-upon-Tyne NE7 7AX. Tel: 091-266 5057.
Redbridge SEMERC, Dane Centre, Melbourne Road, Ilford. Tel: 01-478 6363.
Elfin Systems, Byard Road, Gloucester. Tel: (0452) 411533.
Concept Keyboard from AB European Marketing, Wharfdale Road, Pentwyn, Cardiff. Tel: (0222) 733485.

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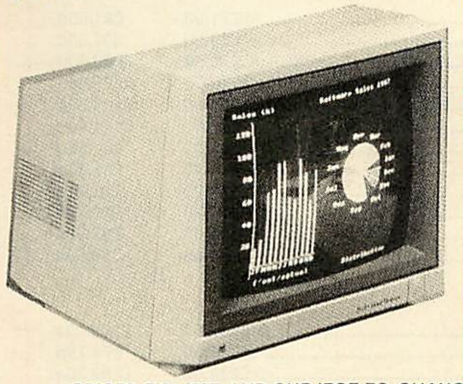
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LETTERS

Write to Letters, Acorn User, 20-26 Brunswick Place, London N1 6DJ

ARC NEEDS MS-DOS

Sir, As an enthusiastic BBC B owner for the past three years, I was encouraged by the launch of the Archimedes. At last I would be able to buy a machine with plenty of memory, a hard disc and the ability to run MS-DOS software, but with all the familiar features of my current BBC micro.
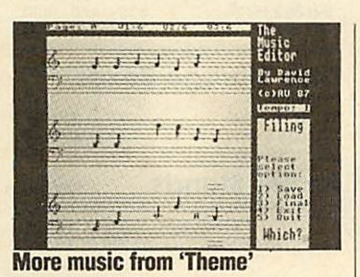
Acorn stopping work on the PC podule dashes all my hopes. Without it I cannot even consider justifying an Archimedes. Schools and colleges are under pressure to conform to the standard used in commerce and industry – MS-DOS. All our recent purchases for teaching have been IBM compatible, and my next computer *must* run MS-DOS software.

If Acorn doesn't come up with an MS-DOS podule within six months, I will very reluctantly have to transfer to a Nimbus or Amstrad PC.

J Alexander
West Midlands

Acorn is now very unlikely to produce a PC podule, but the software PC emulator is very good. It can certainly run most of the standard business packages like *Lotus 1-2-3*. The drawback is that it is rather slower than a real IBM PC, and it leaves less than 300k of free memory. Many PC applications demand more – up to 640k.

There is, of course, the possibility of a PC podule being developed and released by a third-party supplier.



More music from 'Theme'

ELECTRONICS AND MUSIC

Sir, One of the highlights of *Acorn User* has been Joe Telford's computer-aided circuit designing program. But although the compatibility chart on the yellow pages says this runs on a BBC B+, problems occurred with commands like PLOT 188 and PLOT 190. Can you help?

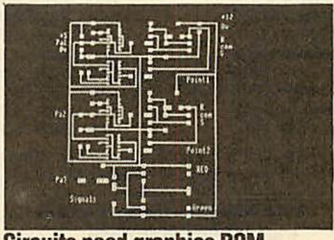
I wonder how many of your readers use the 'Theme' music editor (April 1987) to provide piano accompaniment? I am learning the violin, and it is invaluable. It could be improved by the provision of triplets, and changes of tempo in smaller steps. Could it use shadow RAM to store more music – Dvorak's 'Romantic Piece' is just two bars too long?

Richard Commander
West Midlands

'Theme' could indeed use shadow RAM to store more music – by using a shadow mode and increasing the limit on the number of notes stored. Try this:

```
80 MODE 132:HIMEM
=&4C00
470 c1%=4C00:c2%=&
5400:c3%=&5C00
490 notes%=1024:me
m%=2*notes%
```

to double the memory.


Circuits need graphics ROM

CIRCUITS ON A MODEL B

Sir, Congratulations on the high quality of *Acorn User*, which continues to provide useful help to serious users of the BBC micro. But is there anything that could be done to allow Joe Telford's PCB design programs (December 1987) to run on a BBC model B?

R E Martin
Surrey

What we forgot to say is that a model B+ needs the *GXR* ROM added to run the PCB design programs. A model B could run the same program provided it was fitted with both *GXR* and a shadow RAM board. This is true of many Master 128 programs.

MISSING THE BOAT

Sir, The *Boat Designer* package mentioned in the January issue of *Acorn User* has caught my attention. Could you tell me the address of IC Software?

Jonathan Ward
Bristol

IC Software, 712 Edenbeg, Craigavon, Co. Armagh, Northern Ireland BT65 5HW.

NOT IN THE SCRIPT

Sir, As part of my job as a television production assistant, I have to type out scripts on a wordprocessor. The first part of the script to be typed in – the sound – occupies all of the right-hand side of the page. I can write this easily enough in *View* by setting the left-hand margin stop on the ruler.

At a later stage, it is necessary to type in the picture details, which occupy the left-hand side of the page. If I type these into the left margin, then I have to make sure that the details are not too wide. If they stretch as far as the sound text, then I need to go on to a new line manually. This is so much trouble I often end up adding in the picture details later with a typewriter.

Is there any way of writing the two columns of text separately? Colleagues have suggested a spreadsheet, or even *View Professional*, but it seems that neither would be the answer to my problem.

Angela Bird
London

***View Professional* is, in fact, the answer. Using *VP* you can adjust the widths and wrap-around points of columns A and B, and type in two columns. But the important point you may have missed is that you must change 'Insert on Wrap' (on the Options page) from R to C. This prevents the right column being disturbed when you add text to the left column.**

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R, BL, GR, BR, Y	4.95	4.65	4.25
Citizen 120D	4.70	4.35	4.15
Epson MX FX RX80 FX800	3.35	3.20	3.05
R, BL, GR, BR, Y	4.70	4.45	4.25
MX100/FX1000/FX105	3.90	3.70	3.50
R, BL, BR	4.95	4.70	4.50
LX 80/86, GX 80	2.80	2.65	2.40
R, BL, GR, BR, Y	3.65	3.45	3.30
EX 800	5.98	5.65	5.20
Juki 6100 MS	2.85	2.70	2.60
Kaga KP810/910	2.99	2.85	2.70
R, BL, GR, BR, Y	4.95	4.65	4.25
Panasonic KXP	4.65	4.40	4.20
R, BL, GR, BR, Y	6.50	6.20	5.85
Shinwa CP80MS	4.10	3.85	3.55
Star NL10	5.25	4.95	4.70
R, BL, GR, BR, Y	6.15	5.85	5.55

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11x9½	80	2000	19.75	18.10	16.75
11x9½	80	1000	11.90	–	–
EXACT A4					
11⅔x9¼	70	2000	20.50	12.85	18.30
	90	1000	13.90	12.85	11.90

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132 col	15.70	14.60	13.60

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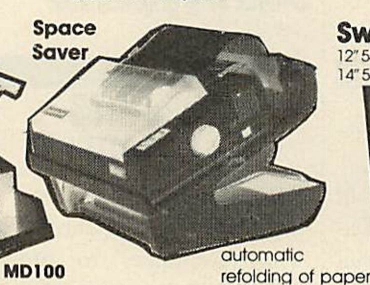
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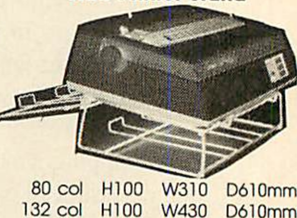
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Snapper King Harold retires

Harold has had enough! He can't get past 3500 at Snapper and the strain is telling. You wouldn't know from the photo that he's only 32 would you? If you call to look at our full range of BBC software and hardware, disc drives, monitors, printers, cables etc. Harold will shuffle about doing his best to help. Just don't ask for a demonstration of Snapper!

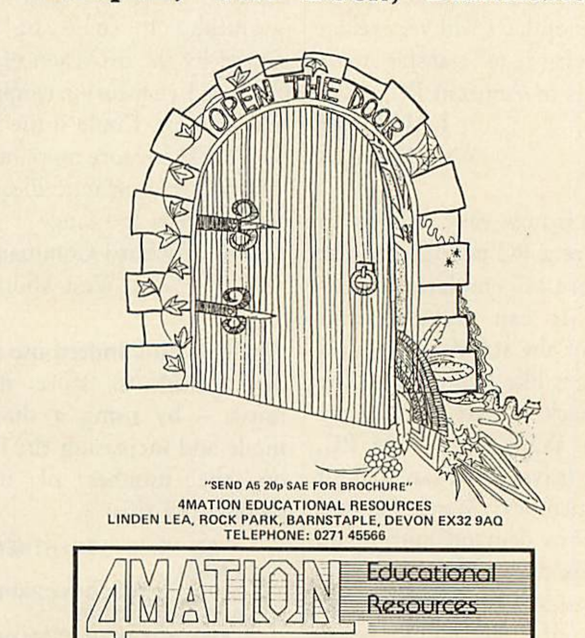
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ONE TOO MANY

Sir, I was delighted with the Printer Driver Generator by Martin Phillips in Hints & Tips for October 1987. But it is difficult to get the '£' sign on my printer. I used to have a Star SG–10, and I could just use code 195. Now I have a Star NL–10, and to get '£' I need to use code 6. But this can't be used until code 27,73,1 is sent, and 27,73,1,6 is too long to enter into the generator. It does, however, work fine on the Acorn *View* Printer Driver Generator.

D N Williams
Inverness-shire

You could include 27,73,1 in the reset section, so 'reset on' is 27,64 and 'reset off' is 27,73,1. Remember you should reset on *and* off at the beginning of every document. Then just use code 6 for the '£' sign.

REFERRING UPWARDS

Sir, I am preparing a report, and I want to quote references using a superscript number in the text, referring to a numbered list of references at the end of the document. With my Epson LX–80, is there any way for me to print in NLQ and use superscripts in the same document?

Darwin Turner
Twickenham

In December 1987's Acorn Forum, Stuart Rogers described a printer driver for *View*, which is capable of controlling both italic and NLQ modes. If you use the superscript control codes in the listing instead of italics, it will serve your purpose.

MANUAL MISTAKES

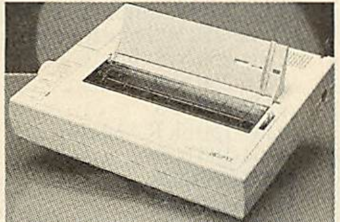
Sir, Your printer compatibility table in the February issue of *Acorn User* has prompted me to pass on a tip which may be of use to owners of the Epson FX800 printer. Contrary to what the manual says, this printer *can* reverse feed using the normal ESC "j" code. Likewise, the manual suggests it cannot print NLQ text in Elite mode – it can.

Nigel Long
Southampton

It could be that other printers have similar 'lost' codes. If you know of any undocumented features, or if you have a printer we haven't covered in a compatibility table, let us know.

DUMPING WITH EXTRA PINS

Sir, After the interesting article on printers in the February



Screen dumps with extra pins

issue, I would like to know if 24-pin printers like the Epson LQ800 can accept a screen dump intended for the normal nine-pin FX range – say using Watford's *Dumpout 3* or *Acorn User*'s *UserDump*.

Chris Meadows
Bedford

No, in general it can't. The LQ800 uses the same codes to control its graphics printing, but their meanings are subtly different, particularly in controlling the line feed pitch. However, this month we include two screen dumps for the Epson range of 24-pin printers – see the yellow pages index on page 111.

SPRITE KNOWLEDGE

Sir, In the April 1987 issue David Atherton explained the sprite system on the Master Compact. The article lacked detail when describing ADVAL(7) and ADVAL(8). These aren't



Compact sprite problems

documented in the Master Reference Manual. Can you recommend any manuals that plug the gaps?

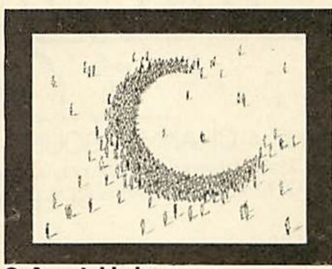
Sean Mulholland
Hampshire

In normal use, ADVAL(7) and ADVAL(8) duplicate the functions of ADVAL(2) and ADVAL(3). But when the Compact sprite system is active, they return the screen co-ordinates of the on-screen pointer. Details are given in the *New Advanced User Guide* from Adder Publishing, and *Master Operating System* from Dabs Press.

LEARNING THE LINGO

Sir, My family recently purchased our first computer, a Compact. I am 12 and very interested in programming, and I have mastered Basic and Logo. I would like to try something more advanced, but need some advice about choosing a suitable language.

Ronan Barnes
Cork, Eire



C: A portable language

It's difficult to suggest any language in particular, because each is good at different things, but a common next step is assembler. Most games and business applications are written in assembly language. Or you could try C. This is a good choice as it is available on many other types of computers too, so your programs would be 'portable' – they could run easily on other people's machines.

MARKING TIME

Sir, In response to the letter from B L Dermott in the February issue, it seems the program he needs is *Departmental Database* from the Cambridge University Press. The software will hold details of up to 250 pupils, including name, date of birth, teaching and tutor groups, plus up to 16 test scores and six grades. It can process the test scores, and print results in a variety of formats or save them on disc in a text file.

Richard Williams
Clwyd

The Cambridge University Press' address is Software Publishing, CUP, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU.

THEORY AND PRACTICE

Sir, In your February issue, Mr A Southerden wrote concerning programs to help teaching the theory of music. One package he might use is *Music Theory Hints and Tests*, by Independent Software, 26 Eason Drive, Abingdon, Oxon. This specifically covers the topics required for Grades 2 to 5 of the Associate Board exams.

Peter Corlett
Oxford

TECHNOLOGY IN SCHOOLS

Sir, In the January issue of *Acorn User*, you referred to a CET report called *New Technology for Better Schools*.

This is in fact the title of a letter sent by the Department of Education and Science to all Chief Education Officers last year. It sets out the Government's strategy for IT in schools, and also contains the Department's advice to local education authorities on the purchase of microcomputers.

This letter has attracted considerable interest among teachers and advisers in schools. Copies of the strategy letter can be obtained from Schools 2 Branch, DES, Elizabeth House, York Road, London SE1 7PH.

A P Duncan
Chief Press Officer, DES

Indeed, the 'New Technology' report was not written by the CET, but it incorporated much of the CET's thinking. The letter sent to Chief Education officers contained technical comparisons of various micros compiled by the CET, and it made similar points to an internal CET report dated March 1987.


Arc emulates a PC

SCIENCE WRITING SOFTWARE

Sir, I have been a regular reader of *Acorn User* since 1983, and must compliment you on the continuing high standard of the articles you publish.

I was particularly interested in November's article on software for the Master 512. I have been using this for some time, and have found a scientific wordprocessor, *ChiWriter*, to be one of the easiest and most versatile currently available. Its merits include the use of technical symbols, Greek letters, subscript and superscripts in text, and a WYSIWYG display. Finally, it is comparatively cheap at £75. And there is a cut-down version available for free copying which is worth seeking out.

I've recently purchased an Archimedes with the PC emulator, and have been running *ChiWriter* on this too. I hope that the emulator will increase interest in running MS-DOS software on BBC micros.

Martin Grossel
Surrey

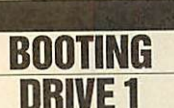
***ChiWriter* is available from Horstmann Software Design, Box 4544, Ann Arbor, MI 48106, USA. *Sci*, a scientific wordprocessor for the BBC micro and Master series, is available for £30 from Chessfield Software, 61 Chessfield Park, Little Chalfont HP6 6HR. Also, see page 141.**

DUAL DISC DRIVES

Sir, I own a BBC B, with Watford Electronics DDFS 1.53 and a double-sided 5.25-inch disc drive. I wish to purchase a second drive. After hearing how much faster and more reliable 3.5-inch drives are, I don't know which to choose. Is it possible to connect a 5.25-inch drive and a 3.5-inch drive via a data DUCK? Will I need ADFS or will my current DDFS suffice?

JP Nicholls
London

There is no reason why you should not connect both 3.5-inch and 5.25-inch drives to your computer via a DUCK (Dualling Up Connector Kit). This allows you to use two single drives as a dual drive. Your current DDFS is fine, although as most 3.5-inch discs are ADFS, it may be advisable to fit this ROM too.

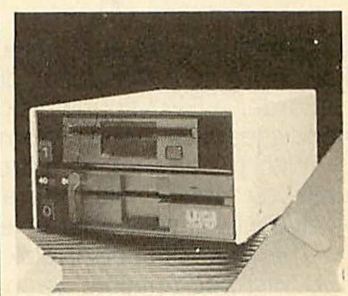


BOOTING DRIVE 1

Sir, I have recently fitted a Cumana CS400 40/80-track 5.25-inch external second disc drive to my Master Compact, to transfer data files to and from my school's Master 128 and model B machines. This works fine, but I am unable to run commercial software on the 3.5-inch drive. After loading the Acorn 1770 DFS into sideways RAM, selecting drive 1 and booting the disc, the computer tries to access drive 0.

G Winterman
Haverfordwest

When Shift-Break is pressed to boot the disc, it automatically tries to boot drive 0. In order to boot discs in drive 1, you must first select drive 1


A drive with a bit of both

(*DRIVE 1) and then type *EXEC !BOOT.

BOOKS WITH WORDWISE

Sir, In February Gwen Holder enquired about writing very long documents with *Wordwise*. There is another way of using *Wordwise Plus* to write books – the *Continuous Processing* ROM from Norwich Computer Services, 31 Cattle Market St, Norwich. It gives all the usual facilities, without any length restriction.

Phil Dyer
Devon

EMULATING PRINT

Sir, I recently bought an Electron with Plus 1 and a Brother M-1009 printer. I can print out normal text but cannot get any of the effects such as enlarged and condensed type. The manual refers to LPRINT, but this isn't in BBC Basic.

H Rice
Bristol

LPRINT will not work on the BBC, although it can be emulated with the appropriate code. Everything following *FX 3,10 is printed, so:

```
10 LPRINT CHR$(14);"BIG";CHR$(20)
```

is the same as:

```
10 *FX 3,10
20 PRINT CHR$(14);"BIG";CHR$(20)
30 *FX 3
```

Buy a Mitsubishi disk drive direct and you save more than money.

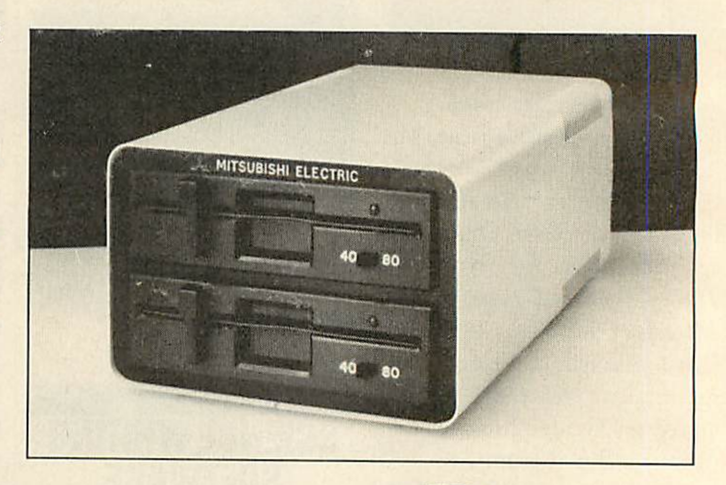
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HINTS & TIPS

LABELS FROM VIEW

A Basic program to print labels from your *View* files, plus an April Fool to flummox your friends

Martin Phillips

In January, we covered *Wordwise*, and described how to send out mailshots by printing labels addressed to people whose names were stored in a *Wordwise* file. Using *View* to send out mail shots is quite straightforward, and certainly much easier than with *Wordwise*. This is because *View* uses macros. A macro can be thought of in a very similar way to a procedure in Basic. Take the example of a mailshot, a standard letter sent to a number of different people. As well as a standard letter, a list of names and addresses will be needed. These will all eventually be entered in the form:

```
B Smith,1 The Lane,Newtown,A
nyshire,AA1 1AA,2334 321321
```

Notice that each part of the address is separated by commas, and that no spaces are inserted directly before or after the commas. The standard letter written as a macro is able to 'pick up' each part of the address using 'patterns'. *View* uses the '@' symbol followed by a number as a pattern, and each pattern can pick up part of the address string as follows:

@0	B Smith
@1	1 The Lane
@2	Newtown
@3	Anyshire
@4	AA1 1AA
@5	2334 321321

So to include the person's name in the standard letter, just put @0 in the text of the letter.

If a comma is needed in the text string, then enclose it within angle brackets:

```
B Smith,<1, The Lane>,Newtow
n,Anyshire,AA1 1AA,2334 321321
```

The standard letter is produced with patterns for the particular lines of the address. Now you define the standard letter as a macro. To do this, put the *View* stored command DM above the start of the letter, and EM at the end of the letter. DM should also have a name for the macro on the same line – in this case we'll call the macro 'AA'. Figure 1 shows the whole letter defined as a macro. Remember that the @0 and @1 patterns will get replaced by items from the list of addresses.

```
M I.......*.......*.......*.......*.......*.......*.......*.......*.......*.<
CO STANDARD SUBSCRIPTIONS LETTER
.. .......*.......*.......*.......*.......*.......*.<
DM AA
RJ 17th March 1988

   Dear @0

   Thank you for your subscription to the society.
   Your address has been recorded as:
                          @1
                          @2
                          @3
            Postcode:     @4
            Telephone:    @5
   If this address is incorrect, please contact the
   Secretary who will be pleased to amend it.

   I look forward to seeing you at the next meeting
   on 29th March.

   Yours sincerely
PE
EM
*****************************************************************************
```

Figure 1. A standard letter set up using a macro

The letter can use any of the normal *View* formatting commands. A page eject at the end of the letter is very important so that all the letters start on a fresh page. The patterns can be placed anywhere in the letter, and any of them can be used more than once if you wish.

Once the letter has been written, the list of names and addresses can be included at the end after EM. In order for each address to have its own letter printed out, it must call up the macro. It does this by having the macro name, AA, in the stored command column. So the final *View* mailshot editing screen would look like figure 2.

Once the macro has been both defined and called up, the PRINT command is given from the command screen, and both letters will be printed out.

Often when dealing with a large mailing list it is inconvenient to have both the macro and the addresses in the same file. In such cases the letter and the addresses can be stored as two separate files. Then the mailshots could be printed out from the command screen by typing

PRINT LETTER ADDRESS

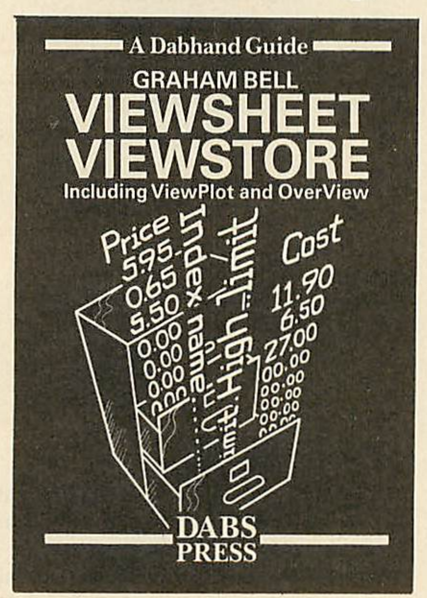
where LETTER is the filename of the letter file that defines the macro, and ADDRESS is the filename of the name and address file. It is also possible to use

SCREEN LETTER ADDRRESS

to check each letter before printing. Labels cannot be done in the same way as *Wordwise* (see January 1988's Hints & Tips), as *View* doesn't have a programming language built into it. It would be be possible to print a single column of labels using the macro facility, but to print two or three labels across is beyond the scope of *View*. Addresses can be printed on the left-hand

ACORN USER OFFER

The Ultimate ViewSheet and ViewStore guide



Acorn User's Editor, Graham Bell, provides the ultimate tutorial and reference work in his *Dabband Guide to ViewSheet and ViewStore*.

This information-packed book covers every thing you need to know, whether you want to check a bank statement or run a multi-million pound business. Written to appeal to both beginner and experienced user alike it describes in detail how to set up, use and maintain spreadsheets and databases and provides comprehensive practical examples and utilities throughout.

The book is applicable to all Acorn machines and filing systems. Just some of the many topics covered include: absolute and relative replication, building an invoice system, database and spreadsheet design, use of SELECT and REPORT, using a printer, machine code utilities, plus large helpings of practical hints and tips.

The accompanying disc contains all the programs listed in the book plus many more, and comes with a handy manual.

Please send me:

________ copies of *ViewSheet/ViewStore: A Dabhand Guide* at £12.95 (including P&P)
________ copies of *ViewSheet/ViewStore* and 5.25-inch disc at £16.95 (£1 discount)
________ copies of *ViewSheet/ViewStore* and 3.5-inch disc at £17.95 (£2 discount)

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Send this coupon with your remittance to *ViewSheet* Offer, *Acorn User* Merchandising, Redwood Publishing Ltd, 20-26 Brunswick Place, London N1 6DJ.

column of labels and then the labels reversed in the printer in order to print the other column, but this is rather tedious.

An easier way to print labels is to use a Basic program. This reads the *View* file and prints the labels as required. Listing 1 on the yellow pages is a program to do just that. It reads a *View* address file produced in the format described above and prints out the labels in a pre-determined format to suit the labels. Listing 1 has all the constants for the adjustments held in the initialisation procedure. Thus once the program has been set up for a particular type of label it can be run again without having to go through a tedious set of checks before printing can start.

It is a good idea to leave the REM statements in, to make things clearer.

- **size%** is the maximum number of addresses anticipated. Making this too large will eventually give a 'DIM space' error.
- **line%** is the number of labels to be printed across the sheet.
- **width%** is the width between adjacent labels measured in spaces. To calculate this for most printers, measure the distance between the left-hand edges of two labels in inches, and multiply by 10. This will give the correct value, as each space is a 10th of an inch. Using condensed mode will of course change this relationship. Making this variable too large will make the address print on the wrong area of the labels in the second or third column.
- **height%** is the number of lines between the top of one label and the top of the next. Usually this is the distance in inches multiplied by six.
- **endline%** is included so that the whole of the address string does not need to be. In the example given above, the telephone number is included. Clearly this would not need to be printed on an address label. The last item in *View* is @4, so endline% is 4.
- **startline%** is similar to endline% except that it determines the start point in the address string for printing. The first item in the address string is 0, as with *View*'s macro variable @0.
- **indent%** gives the number of spaces each label is indented from the left margin of the printer. Increasing this moves all the text over to the right.

It's best to print some trial labels on normal printer paper and lay this over a page of labels to see the spacing. Once the settings are correct, then save the program again with those settings in.

The program works by first reading in a *View* address file. This should be a file with only names and addresses as described above, although other information such as telephone number can be included with the address. The file is read in byte by byte, which is a bit slow, but it is not possible to use the INPUT# statement. This is quicker, but it only reads in strings saved with the PRINT# command. If you have a disc system, the format of the *View* file can be seen by doing a *DUMP on the address file. Each address is then split up into separate lines, which is a rather inelegant procedure, and then stored in the array add$. Once in the array format, it is quite easy to manipulate the separate lines of each address as required. Then each address is printed out in the format determined by the initialisation procedure.

```
MJ .......*. .....*.......*.......*.......*.......*.......*.......*.......*.<
AA Mr A B Carter,10 Old Street,Newtown,Waltshire,CX3 9JJ,0421 654321
AA Mrs S J Smith,24 Lower Lane,Nether Poppleton,Chumpshire,CH99 1AG,0234 31465
AA Mr A N Haddock,61 Fish Lane,Watertown,Southshire,SS1 2EJ,2230 612312
AA Miss B Y Amile,1 The Road,Anytown,Backshire,BK2 1WE,2334 544987
AA Mr J J Jones,123 All Souls Lane,Acaster,Nethershire,NE3 2GJ,3412 344322
AA Mrs I C E Snowball,23 Snow Lane,Coldville,Iceshire,CO3 23A,2367 768889
AA Mr A N Other,56 Anylane,Anytown,Anyshire,AA1 1AA,2222 222222
AA Ms G Farmer,<Flat 1,Manor Court>,New Town,Southshire,NT5 1QQ,0443 123456
**************************************************************************
```

Figure 2. The names and addresses ready to be read in to the *View* micro

EVENT HANDLING FOR APRIL FOOLS

Everybody assumes that the computer is infallible; this month, for a bit of fun, here is a program that will prevent the computer working as it should. The program uses events to check when a key is pressed, and then causes some other action. Listing 2 will print an extra 'e' every time the 'e' key is pressed. Because it uses events, it is then possible to load a wordprocessor such as *Wordwise* or *View* and see the effect.

The operating system works by stopping your program over 100 times every second, to see if any work needs doing This is called an interrupt. There is one regular one every 100 milliseconds, plus extra ones whenever something happens like a key being pressed or a character arriving at the serial interface. Now interrupts are difficult to deal with in a program, but an event is a simplified version of an interrupt. An 'event' allows you to tack a little routine of your own on to the machine's interrupt handling. There are seven different types of event – we're interested in number 2, which occurs when a character enters the keyboard buffer.

*FX13 followed by the event number disables that event, and *FX14 followed by the event number enables that event. In machine code, Osbyte calls may be used to the same effect. Control is handed to your event-handling routine via a vector at locations &220 and &221 (Evntv), into which the entry address of your routine is inserted. The event handler is entered with interrupts disabled and should terminate with an RTS quite quickly.

The routine first stores the registers, then checks to see if the character entering the keyboard buffer is a lower case 'e', which has an ASCII value of 101. This could be changed to any other character if you wanted. If the key pressed was the 'e', then control passes to the subroutine labelled 'fool'. This selects the Osbyte routine to insert a character into the input buffer. This is Osbyte 138, and X identifies the buffer. Zero is the keyboard buffer. Y is the character to be inserted.

In this case, because Y is unchanged, it inserts another letter 'e'. So when an 'e' is pressed, two 'e' characters will appear on the screen. There are many possibilities!

```
.fool
LDX #0
LDY #127
LDA #138
```

This puts an Escape code into the keyboard buffer. This is fun when using *Wordwise* or *View*, as every time the 'e' key is pressed, the machine changes back to the command screen. Consider the effect of Caps Lock, or Delete replacing 'e'. Design your own April Fool!

Finally listing 3 shows how this use of events can be developed. Listing 3 checks to see if the 'e' key has been pressed five times and then plays a musical phrase. The program is a development of listing 2 but has a counter which checks how many times the key has been pressed. There is a parameter block for the sound data, stored in locations &90 and &9D.

See page 111 for details of the listings.

STEP BY STEP

CHECKING YOUR CHEQUES

The first of a new series on applications software takes you through a *Viewsheet* spreadsheet to keep a tally of your spending

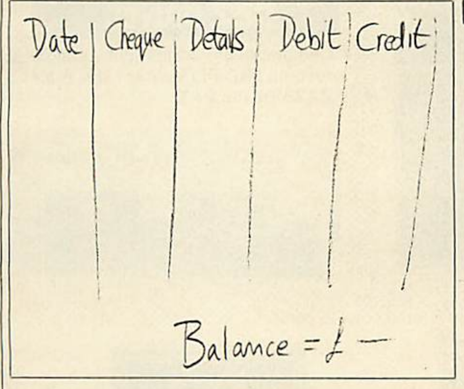
Bruce Smith

This month we start a new series which is designed to help you use your micro as a more effective tool. In each article we'll be looking at one of the many excellent productivity packages available for the Beeb and working through, step by step, screen by screen, its design and use.

The topic this month is the *ViewSheet* spreadsheet and how to design a cheque book reconciliation sheet which will help you balance your books.

The key to using all application software is planning. Ten minutes thought will save a lot of work in the long run.

The first thing to do when designing any spreadsheet is to make a list of the items of information it will need to hold. To perform a cheque book reconciliation, details of cheques paid in and out will be needed, along with the date, details of the transaction, the cheque number for every cheque issued and a running balance. A quick sketch on paper with some dummy information should make this clearer.



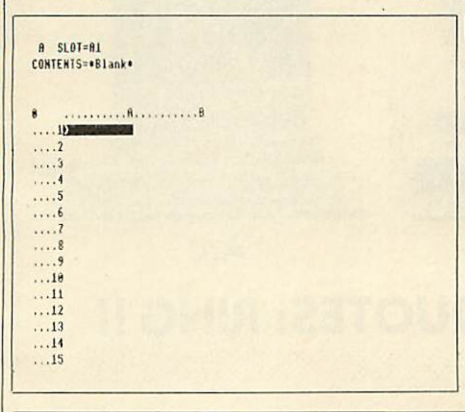
Preparation

Sketching out the spreadsheet should define most of its components. Five columns are needed and these will be contain 'slots' holding different information. Three columns will hold simple text information, and two must be capable of accepting monetary values (debits and credits). These will need to work to two decimal places. Finally a slot is needed to hold the balance.

File management is important and should be organised to suit individual requirements. Ideally a separate sheet should be used for each months' transactions – 12 spreadsheet files would complete one year and these can go onto a single clearly labelled disc.

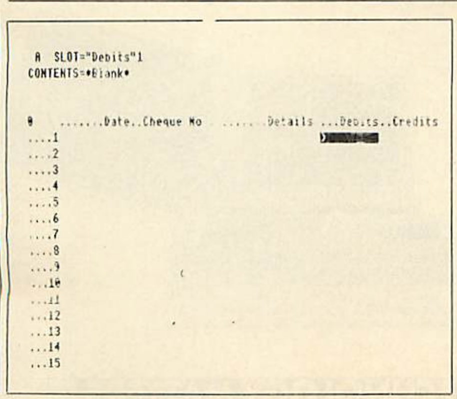
If you use ADFS then a suitable directory could be created to hold the 12 files: *CDIR 1988, then *DIR 1988.

With *ViewSheet* up and running name the file 'Jan' by typing 'NAME Jan' from the command prompt.



Screen windows

Initially all the slots in the sheet are the same – they are the same size and show any numbers they contain in the same way. There are three different types of information we wish to enter – short pieces of text (the date and cheque number), long pieces of text (details of the transaction) and numbers rounded to two decimal places (credits and debits). So we can define different areas of the screen to have different types of slots to take account of these needs. These different areas are called 'windows' and can be defined by pressing f1 in the spreadsheet itself. The first window is called window 0 so reply '0' to the 'Window?' prompt and press Return. The parameters to set up window 0 correctly are shown in table 1. Type them in with spaces between each, and delete any of the original line remaining with f9 or by overtyping with spaces, then press Return.



More windows

Repeat the procedure for windows 1 and 2, again using the values given in table 1. To move the cursor between the windows press f2, which will take you to the first slot of the next window.

Each column needs to be labelled to make it clear what information it contains. This can be done by redefining the individual column headings – replacing the dots with text. Move the cursor into each column in turn, and press Shift-f3. Enter the heading for each column, as shown, in response to the 'Column Heading?' prompt. Note that to move from A1 to B1 you use the cursor right key, but to move to C1, which is in the next window, you use f2.

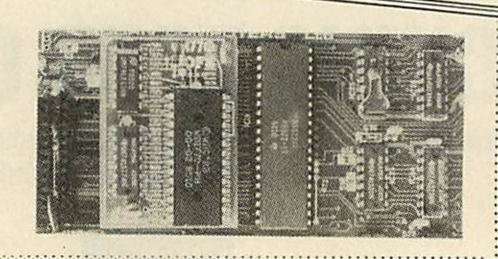
When you have finished, the screen should look like the figure on the left, so you can check your progress as you work though this guide.

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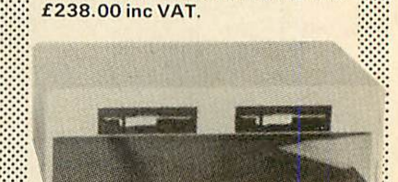
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MEMORY

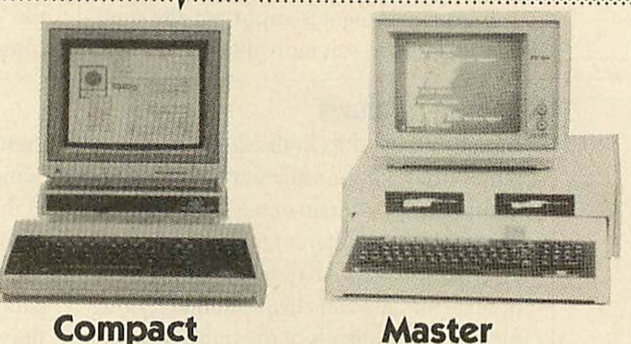
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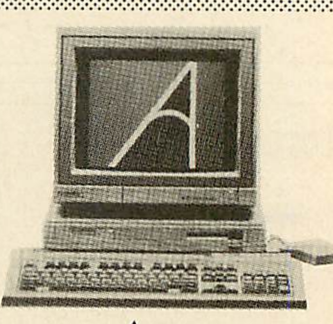


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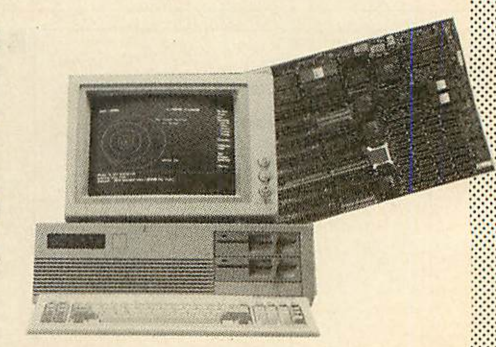
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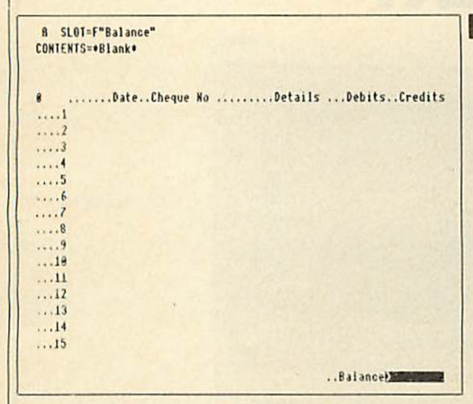
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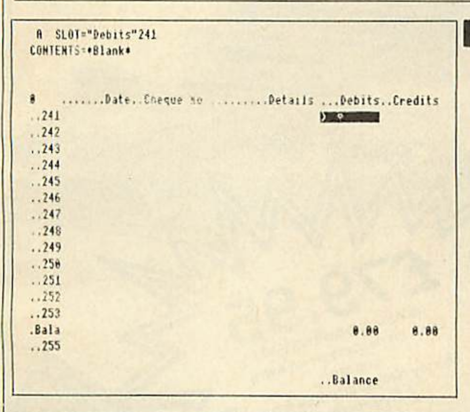
SOLIDISK — WHERE TECHNOLOGY MATTERS



Vertical balance

As information for each transaction will be read across the sheet, the windows must scroll vertically together rather than individually – to keep the information in line. Windows 0, 1 and 2 must therefore have the 'V' option inserted as part of their Opt settings. This has already been done if you used the settings from table 1.

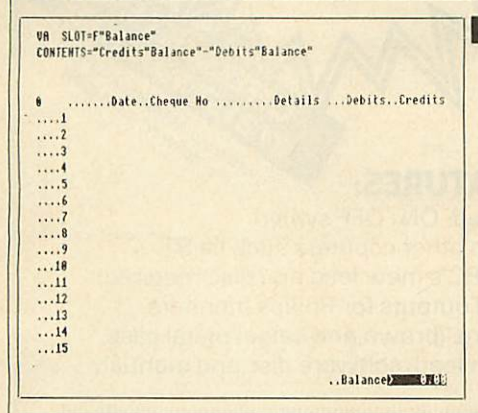
A single slot can be used to display the balance total by defining another window for it – window 3 (again see table 1). The row heading can be changed to 'Balance' by moving to the window with f2, then using Shift-f4 and answering the prompt 'Row Heading?' accordingly.



Credits and debits

The credits and debits columns must be added up, and from this a balance can be obtained. The formula for this can be placed in any two suitable slots. The slots must come after the figures which you want to add up, so putting them towards the bottom of the credit and debit columns (ie, D254 and E254) would be sensible. Go to each slot in turn by pressing f7 after first positioning the cursor in window 2. Insert D1D100 and E1E100 into each respectively – the value 0.00 will appear in each slot. D1D100 is the sum of all the slots between D1 and D100.

If you are likely to use more than 98 transactions per month, you could use slots lower down the sheet than D100 or E100. Note that the totals for each column are not normally displayed on screen, though a fifth window could be defined to do so if you wanted.

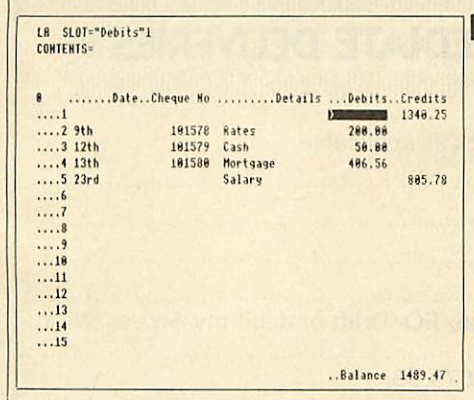


It all adds up

The balance is calculated by subtracting the total debits from the total credits. With the cursor in window 3 (slot F254) insert the formula to do this: E254-D254. Note the standard use of row 254 to hold sub-totals or totals. Make sure that linked vertical scrolling is not set for this window – you want this to stay fixed.

Now move to window 0 and go to slot A1 to realign the columns.

The basic sheet is now ready, and as copies of this will be required for each month, now is a good time to Escape to the command screen and save it, first as 'Jan', and then again as 'Dummy', the latter forming a template for future use.



Data entry

The first item to be entered is the account's initial balance; this should be entered as a credit. In this case, the balance is £1340.25. Transactions can then be put in as they take place. Data can be entered in one of two ways. First by using f2 to step through each window, entering data en-route. Or second, simply by entering all data in window 0, scrolling the sheet horizontally through it to reach the right-hand columns. The information you enter into window 0 will appear in the other windows in the correct format. This looks slightly more messy on the screen but is much easier to do. The first two columns can be realigned in the window when complete with the cursor keys. Don't forget to save the 'Jan' file when it is finished. At the end of the month, your current balance shown at the bottom of the screen will have been adjusted to account for all the transactions.

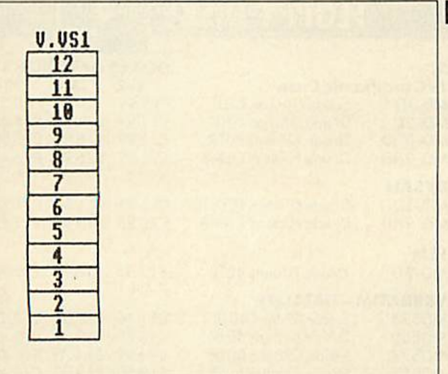
Wi	TopL	BotR	Pos	Cw	Bw	Fmt	Opt
0	A1	B15		10	5	FRM	V
1	Cl	c15	R0	15	0	FRM	VS
2	D1	E15	R1	8	0	D2RM	VS
3	F254	F254	B2	8	9	D2RM	T
4	F255	F255	B0	10	5	FRM	T

Table 1. Window settings

File	WRITE	READ	File	WRITE	READ
Jan	(1,1,1,F254)	—	Jul	(1,1,7,F254)	(1,1,6)
Feb	(1,1,2,F254)	(1,1,1)	Aug	(1,1,8,F254)	(1,1,7)
Mar	(1,1,3,F254)	(1,1,2)	Sep	(1,1,9,F254)	(1,1,8)
Apr	(1,1,4,F254)	(1,1,3)	Oct	(1,1,10,F254)	(1,1,9)
May	(1,1,5,F254)	(1,1,4)	Nov	(1,1,11,F254)	(1,1,10)
Jun	(1,1,6,F254)	(1,1,5)	Dec	(1,1,12,F254)	(1,1,11)

Table 2. WRITE and READ codes for the year

STEP BY STEP

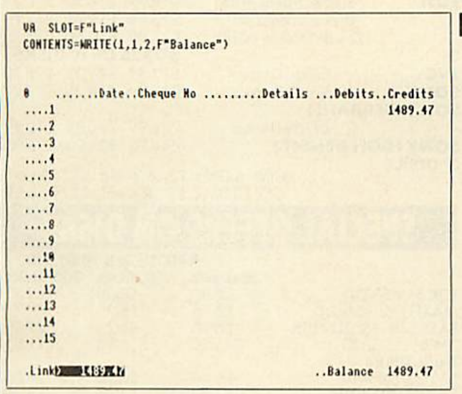


Link files

When you move on to the next month, you need to transfer the old balance to the new sheet. This can be done using a link file – a file into which balance totals are automatically written each time they are updated, and which can be read by the new month's sheet.

Link files are always held in a directory called 'V', so ADFS users must first create this within the 1988 directory (*CDIR V). DFS will accommodate it automatically.

The link file should be created first using the following command from the prompt: CREATE 1 1 12. This creates the file V.VS1, which has 12 slots for balance values from January (slot 1) to December (slot 12). All link files are called V. VSn where n is the first number after CREATE.



Writing the balance

The balance is written to the link file by placing a WRITE command in any vacant slot in the sheet. This is best done by defining a dummy window, details for which are listed under window 4 in table 1. Row 254 can then be re-headed as 'Link' if required. The following formula should then be entered into slot F254: WRITE (1,1,1,F254) where 1 is the VS file number; 1,1 the array slot and F255 the slot to be written to the file. The dummy link window may be turned off by inserting a 0 into the 'Opt' column of the window 4 definition. Save these sheet updates (the filename should still be Jan).

```
VA  SLOT=F"Link"
CONTENTS=WRITE(1,1,1,F"Balance")

0    .......Date..Cheque No .........Details ...Debits..Credits
....1                                                   1340.25'
....2 9th          101578  Rates              200.00
....3 12th         101579  Cash                50.00
....4 13th         101580  Mortgage           406.56
....5 23rd                 Salary                        805.78
....6
....7
....8
....9
...10
...11
...12
...13
...14
...15

.Link                                     ..Balance  1489.47
```

Reading in write

The Feb file can now be created. Load in the Dummy sheet and rename it as Feb. The balance from Jan, now stored in the link file, can be read into the credits column at slot E1 ("Credits"1) by inserting the following formula: READ (1,1,1) – read value from slot 1,1 in file VS1. The Jan balance value will be read in and displayed in the credits column.

Re-create window 4 as described above and insert the WRITE formula in slot B254 – WRITE (1,1,2,F254). Note the cell value now points to the Feb slot in the link file (slot 2). Save the file.

The remaining sheet files could be created in this way – though not until the printer windows have been defined as described below. However, it is more practical to create each new file when the month arrives. Remember to adjust the third value in the WRITE and READ formula as required. Table 2 lists the values for each month.

Printing out

To obtain a print out in the correct format, the print windows (windows used when outputting to the printer) can be copied directly from screen windows. This is simple to do. Display each of the four screen windows (0 to 3) in turn and type P0 instead of just 0, before pressing Return to save. To do this, you can insert a space with f8, then type the 'P'. These values can be edited into the Feb file and then into the Dummy file, where they will be set for all future windows you create.

The SCREEN command previews the output on screen before actually printing it.

Things to do

Using the SW (save windows) command all the window definitions, screen and printer, can be saved and then loaded into a new sheet using the LW (load windows) command to create a template for each month.

The reconciliation sheet could be adapted to display the total credits and debits for each month. However it is probably more useful to write these values to a link file (V.VS2) for display in an end-of-year summary sheet which should help you monitor cash flow. Do remember that the value held in E254 is not the total credits for that month – it includes the balance from the previous month. Therefore a dummy cell should be set aside to calculate the total credits value which is found by summing E2 to E100. This value, along with D254, can be written to the new, bigger link file.

This link file will be 12 months deep by two slots wide so CREATE 2 2 12 would build the correct file. Column 1 of the file should hold debits, and column 2 credits.

Got a problem?

Are you struggling to get to grips with a commercial product and want it explained? Do you have a particular need but can't work out how to do it? Let me know and I'll see if I can go through it step by step. Perhaps you already have an interesting application up and running that would benefit others – then I want to know about it. It can be any type of commercial software; this feature is not limited to spreadsheets and databases.

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	HR15 MS	£3.00	£2.60	£2.30
	HR15 also for HR25/HR35			
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	84	£3.70	£3.20	£3.00
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	Mate 20 Black	£6.60	£6.20	£6.00
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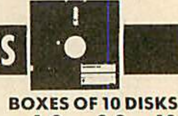
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ACORN FORUM

ASSEMBLING FILES

Assembling code from text files, an extended copy key and improvements to Artisan are up for discussion

David Atherton

D J Holden from Sydenham was interested in the multi-file assembler in December 1987's Forum, but he points out that this only works with Basic assembler programs. It cannot work with plain text files. Mr Holden normally writes his code as a series of text files in *InterWord* (transferred to *Wordwise Plus* to generate a plain ASCII version). He has developed a very clever method of performing a similar task without having to worry about line numbers or passing data via integer variables. The program can be used in the same manner as many of the dedicated and expensive assembler ROMs.

The method uses a short Basic program to call the main machine code routine which *EXECs the text files to be assembled. This is done twice to give a two pass assembly. As the actual assembling is done by Basic, all the normal Basic expressions can be used, for example LDA #ASC"A" instead of LDA #&41. The Basic program copys the value of TOP into &70 and &71, and then sets a higher value for LOMEM which allows the Basic to have assembler source appended, and a lower value for HIMEM to allow the object code to be assembled above it. The list of filenames to be used is stored at &C00, the names separated by commas. This list will be read by the machine code. P% and O% are set up for each pass, and the assembly procedure is called.

The machine code program is called with X% set to the number of the file in the list at &C00. The code first pokes a Basic end-of-program marker at the end of the calling program, to cut off text left over from previous files. Then it finds the next filename and copies it to a buffer. All the Basic variable pointers from page 4 and the LOMEM, stack and heap pointers from zero page are also copied to a buffer. The Bgetv and Evntv vectors are changed to point to subroutines in the code, and the timer is set to cause an event after about

```
 Words-12    Characters free-26744 I
LDY #0
LDA #1
JSR osargs
LDY #0
.nget
LDA (namptr),Y
INY
CMP #ASC" "
BEQ nget
BCC non
DEY
LDX #0

 End
```

Create assembly language routines in *Wordwise Plus*

one sixth of a second. 'AUTO 200' is poked into the keyboard buffer using Osbyte 138 and the program returns control to Basic.

The next instruction on line 70 is END. This means that Basic leaves the program, puts out its '>' prompt, and looks to the keyboard where it finds the 'AUTO 200' command. So then it prints the line number and waits.

Soon the timer crosses zero, and this causes an event which passes control back to the machine code, sets a flag to show that the first timer event has occurred, then uses Oscli to *EXEC the required file containing the assembly language.

Each time a character is received from the file an event is caused which the changed Bget vector redirects to the code. Here the timer is set back to a half second delay, thus preventing an event. Meanwhile Basic is dealing with the file and adding it to PROCass. Eventually the end of the file is reached, nothing more is passed through, and after half a second the timer crosses zero. Again control is passed to the code which restores the Bget vector, sets the flag to show that the second timer event has passed, sets the timer to a short delay and then finally causes an Escape with the Osbyte 125 routine.

Back with Basic, the Escape is detected and again the program ends with the 'Escape' message and the prompt. This time there is nothing already in the keyboard buffer as the Escape empties the buffer, but soon the timer crosses zero again and control passes back to the code.

All the Basic variable pointers are copied back, the timer events are disabled and 'GOTO 50' is poked into the keyboard buffer. Back to Basic again, which obediently jumps into the program at line 50 and executes the new PROCass.

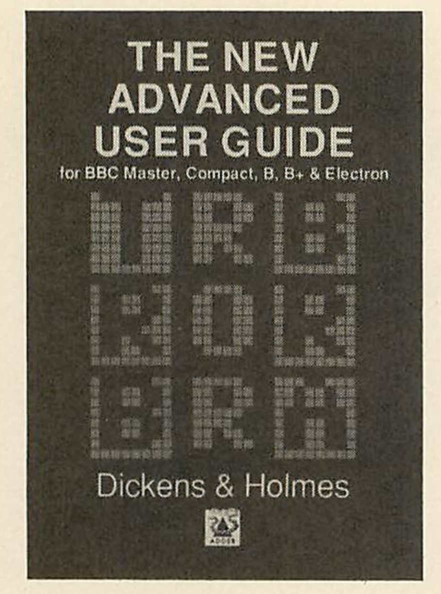
Returning from the procedure, we increase the file pointer X% and call the code again for the next file in the list. If all the files have already been done then the code will poke 'GOTO 80' into the keyboard and exit. At line 80, if this was the first pass then the pass variable is set for the second pass and the program jumps back to line 40 to do it all again. Otherwise the program will end at line 90.

To use the program, which only works with Basic 2 and upwards on disc-based machines, you will need both the Basic control program, and the machine code

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created by the source listing, both found on the yellow pages. Now create your program's assembler source code as a number of short files. Alter the Basic control program so that &C00 contains the names of your files, with drive and directory prefixes if you like. In the listing we have used names EX1, EX2, EX3 and EX4, but they can be anything you like. The machine code should be *LOADed at &900, and then the Basic program may be run. Because specific line number references are used by the machine code, it is vital that you do *not* renumber the Basic program under any circumstances.

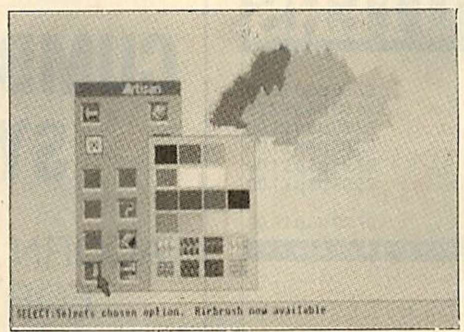
Note that the space between TOP and LOMEM must be greater than the largest file to be used. With the value of LOMEM shown, assuming PAGE &1900, this will be 7k. Generally this means a maximum of about 4k of ASCII source program. The space between LOMEM and HIMEM is used to store all the labels and variables used in the files, and there's 6k of space in the example. The remaining space between HIMEM and the bottom of screen RAM (&7C00 in mode 7 or &8000 if shadow RAM used) is available for the assembled code; this can be up to 11k in the example. This division of memory can all be changed as required, with the obvious compromise between the three areas.

The program will read any assembler source code which has the same syntax as Basic assembler code, minus the line numbers. Spaces don't matter, but no embedded commands should be present. If in doubt, spool your file from *Wordwise* or *InterWord*, or WRITE from *View* with any rulers removed. Don't forget that as all the files are dealt with together, all variables are global across the entire range of files, and if you use a label twice, your code won't work. There is no need to include square brackets in the source.

£5

ARCHIMEDES ARTISAN

A reader from Marden, Kent, going under the mysterious name of 'The Phoenix' has recently bought Clares' *Artisan*. A facility missing from this otherwise powerful package is an airbrush, but here is a routine to add one. These alterations should be done on a backup copy of the program, not the original. The program ART5 should be loaded and the lines in listing 2 on the yellow pages typed. Re-save the ART5 file to your backup disc, and the program can then be re-booted. If you really feel confident, *SLOAD the file 'ARTICONS' using the SEDIT program supplied on the Welcome disc to change the sprite 'oval' from an ellipse to some sort of spray can, and then save ARTICONS back to the disc, just to make the new option more clear. The airbrush replaces the oval brush option, which seems superfluous to our reader. The size icon displayed at the top of the paint menu (now not an ellipse but a circle) gives the maximum possible range of paint from the can, although the shape it produces is in fact a square.



Add a spray can to *Artisan*

£10

IMPROVED COPY KEY

Andrew Piskozub from Bradford has sent a small program offering an improvement to the model B's Copy key function. Andrew has long felt that the Copy key editor is a bit involved, as it uses two separate cursors. The worst part is that you often only want to perform the smallest alteration, yet you must hold down the Copy key for ages to re-insert a whole line. The auto-repeat is of course helpful here, but Andrew has come up with a much improved version which uses the Tab key to allow you to copy a number of characters at once.

The listing in the yellow pages will generate a machine code file called CPY, which should then be *RUN. When in place, you work the program by moving your copy cursor in the normal way, then instead of pressing Copy, press Tab followed by another character key. A copy action is then performed repeatedly until the input cursor reaches the character which followed Tab. That character is not copied. It follows therefore that to reach the end of a line, Tab, then a space should be typed.

The machine code program occupies three pages of RAM, and you may choose where to locate it. Andrew recommends using space from &1900, and increasing the value of PAGE to &1C00. An alternative place is from &1600-&1900. The program works by inserting two new routines into Osrdch. On initialisation, the Osrdch vector is set to point to the first of these routines, which just returns characters from a new keyboard input buffer. This buffer contains any characters copied from the screen by the new copy routine. If empty, control passes to the second routine, the first part of which is just a copy of Osrdch in RAM. This copy is needed since it is necessary to insert some extra code within the ROM routine, but as ROM cannot be modified, the routine has to be moved into RAM first. If the trap for the Tab key fails, control is returned to the operating system ROM. Otherwise the 'copy. to' character is read from the keyboard, and the new buffer is filled with copied characters from the screen. A flag is then set so that any further 'keyboard reads' return characters from this temporary buffer until it is emptied.

This program can only be used with OS 1.2 on the model B. Normally of course, we frown on this sort of coding in Forum, but as many readers have expressed interest in tagging on extra bits to existing operating system routines, we have published it as an example of how to do this. For serious work of course, you can't copy portions out of the ROM, because there are so many versions of the operating system, but for personal interest, this approach to writing system utilities allows you to do many things that just aren't possible by using normal vector interception techniques.

This is David Atherton's last Acorn Forum column – from May he'll be writing Hints and Tips. Next month, Forum is changing. Ace programmer David Acton will be starting Arc Forum, a new column for regular Archimedes coverage, and offering a mixture of technical hints and advice on your A300 or 400 machines. If you've got any interesting routines or information you feel should be stored with other Arc owners, then send them to Arc Forum, Acorn User, 20-26 Brunswick Place, London N1 6DJ. *For details of the Acorn Forum listings, turn to page 111.*



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"This kit from Brainsoft can be thoroughly recommaded" from review in Archive magazine December 1987.

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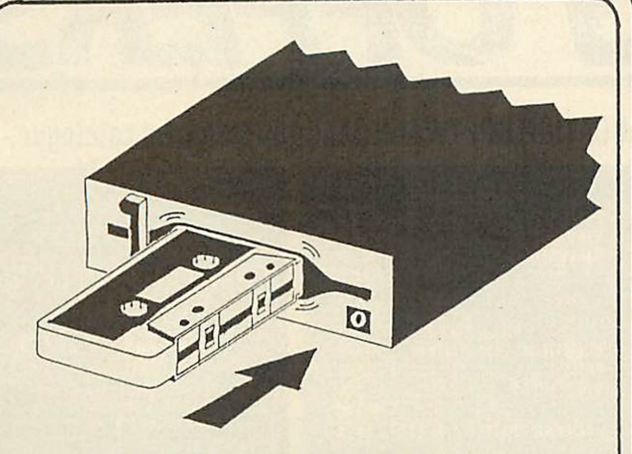
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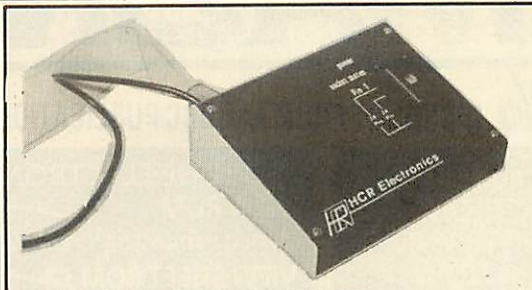
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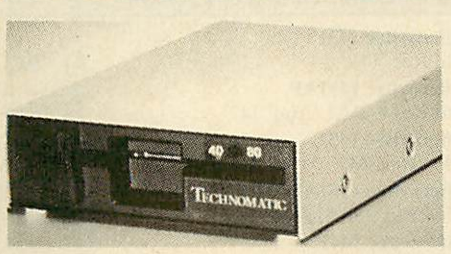


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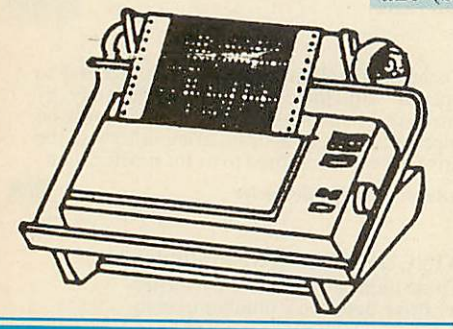
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PRINTER STAND

A new style printer stand with easy paper feed and paper seperation, provides complete access to paper. Can be used with both top and bottom paper feed. Very space efficient. **£26 (b)**



MODEMS

All modems listed below will be supplied with a BBC data lead.

MIRACLE WS4000 V21/23	£135(b)
MIRACLE WS3000 V21/23	£244(b)
MIRACLE WS3000 V22	£409(b)
MIRACLE WS3000 V22 bis	£537(b)
(All modems are BABT approved)	
BBC Data Cable for WS3000/4000	£10(d)
MIRACLE WS2000V21/23 & BELL stds	£92(c)
WS2000 Auto Dial Card	£27(d)
WS2000 Auto Answer Card	£27(d)
S2000 SKI Kit	£5(d)
WS2000 User Port Lead	£5(d)

TIME WARP

Real Time Clock, Plugs into the user port, battery back up as standard, includes manual, demo software including a diary/planner application program **£29(d)**

PLOTTERS

Hitachi 672XD A3 4 Colour HPGL	£465(a)
Plotmate A4S	£420(a)
Plotmate A3M	£640(a)
Roland 880 A3 Flat bed 8 col	£599(a)

Variety of Plotter pens and accessories in stock.

Large Plotters available. Please enquire.

PRINTER SHARERS & BUFFERS

TSB256 Printer Sharer Buffer

Provides a massive buffer size of 256K and connects three computers to one printer. Autoswitching between computers. Facility to print copies. **£189(b)**

BUFFALO PB Buffer

Parallel buffer for internal fitting to most Epson printers. Simple to instal.

PB128 (128K) **£89(c)**

PERIPHERAL & COMPUTER SHARERS

High quality switches to allow the user to switch between computers, printers, modems etc. Fully shielded metal cases, all lines fully switched.

	Parallel		Serial
2 Computers to 1 Printer 36v36-2	£25(c)	25v25-2	£25(c)
3 Computers to 1 Printer 36v36-3	£39(c)	25v25-3	£39(c)
4 Computers to 1 Printer 36v36-4	£45(c)	25v25-4	£45(c)
2 Computers 2 Printers		25v25-x	£49(c)
X-over 36v37-x	£49(c)		
BBC Cable Set 3 to 1 (1m ea)	£24(c)		
BBC Cable Set 4 to 1 (1m ea)	£30(c)		

BBC Computer Sharer: TCS26

1 computer to 2 printers fitted with BBC cable **£21(c)**

Paper & Labels

Plain fanfold paper with microperforation:

2000 sheets 9½ × 11″	£12 (£3.50)
2000 sheets 14½ × 11″	£18.50 (£4.50)
1500 sheets A4 90gsm	£18.00 (£4.00)

Labels/1000

Single Row 3½ × 1 7/16	£5(d)
Triple Row 2 7/16 × 1 7/16	£5(d)

PROGRAMMING ACCESSORIES/SOFTWARE

Compatible with B, B+ and Master

EpromRyter (Epromer II) EpromRyter is compatible with BBC Master only. See page 7.	£89(b)
Upgrade of Epromer II to Eprom Ryter (Please return your Epromer II)	£49(b)
EPROMER II	£89(b)
MPROMER	£49(c)
META ASSEMBLER	£145(b)
PORTAL EPROM EMULATOR 512K	£245(b)
TEAM Disassembler	£145(b)
EPROM ERASERS	
UV1B 6 eproms, safety cutout	£47(b)
UV1T 6 eproms, timer, safety cutout	£59(b)

MONITORS

All Monitors supplied with a suitable lead.

12″, 14″ and 20″ MONITORS

Microvitec 1431 Std Res, 14″	£179(a)
Microvitec 1431AP Std Res + PAL/Aud, 14″	£199(a)
Microvitec 1451 Med Res, 14″	£225(a)
Microvitec 1451AP Med Res + PAL/Aud, 14″	£255(a)
Microvitec 1441 Hi Res, 14″	£359(a)
Philips 14″ RGB Med Res, 14″, high contract screen, TTL/Linear Input, Mono/Colour Switch Sound Input. Separate controls for brilliance and contrast. This is the monitor used by Acorn with Archimedes and Compact Computers.	£195(a)
Sanyo CRT 70 14″ High Resolution Monitor *Resolution better than Microvitec 1441, suitable for Master, Archimedes.*	£209(a)
Microvitec 2030CS 20″ Standard Resolution RGB/Comp Video	£380(a)
Microvitec 2040CS 20″ High Resolution RGB/Comp Video	£675(a)
TAXAN SUPER VISION 620 12″ Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible	£269(a)
TAXAN SUPER VISION 625 12″ Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible.	£319(a)
TAXAN 770+ MultiSysnc Autoscan 14″, ideal for utilising the hi res modes on Archimedes. Our price includes a tilt & swivel stand	£499(a)

12″ MONOCHROME MONITORS

PHILIPS BM 7502 Hi Res green screen	£69(a)
PHILIPS BM7522 Hi Res amber screen	£75(a)

SPECIAL *for this month*
Swivel Stand for Philips Mono monitors £6(c)
(if purchased with monitor)

MONITOR ACCESSORIES

Microvitec Swivel Base (14″ plastic monitors)	£17(c)
Monitor Stand Models B & B+	£10(c)
Monitor Stand Master	£13(c)
Double Tier Stand Models B, B+ or Master	£24(b)
Taxan RGB Lead	£7(d)
Microvitec Lead	£4(d)
Monochrome BNC/Phono Lead	£4(d)

TECHNOMATIC

305 Edgware Road, London W2 Tel: 01-723 0233

BOOKS

No VAT Carriage Code (c)

LANGUAGES
- 6502 Assy Lang Prog £19.95
- 6502 Programming £13.95
- 8086 Book £23.95
- Acorn BCPI User Guide £15.00
- Acorn FORTH £7.50
- Acorn LISP £7.50
- Acorn ISO Pascal Ref Manual £10.00
- Intro to COMAL £10.00
- Intro to LOGO £7.50
- Micro Prolog Ref Manual £10.00
- Introduction to Turbo Pascal £14.95
- Prog the Micro with Pascal £8.50
- The Supervisor's BBC Micro £10.95

BBC MICRO GUIDE BOOKS
- Inside Information £8.95
- Maths Prog in BBC Basic £7.95
- The Friendly Computer Book £4.50
- Toolbox 2 .... £10.95

ARCHIMEDES
- Archimedes Reference Manual .... £29.95(b)
- ARM Assembly Language Prog .... £12.95(b)

PROGRAMMING/UTILITY
- Advanced Sideways Ram User Guide £9.95
- Advanced User Guide (BBC) £15.95
- Applied Assembly Language on the BBC £9.95
- BBC Micro Advance Programming £9.95
- BBC Micro Ref Guide (B Smith) £10.95
- BBC Micro Sideways ROM's RAM's £9.95
- Guide to the BBC Rom £9.95
- Beginners Guide to W.P. £7.95
- Mastering Assembly Code £8.95
- **Mastering Interpreters & Compilers** £14.95
- **Master Operating System** £12.95
- **Mastering View, Viewsheet & Viewstore** £12.95
- **View by B. Smith** £12.95
- View 3.0 User Guide £9.00
- Viewstore User Guide £9.00
- Viewsheet User Guide £9.00
- Wordwise Plus £9.95

SOUND & GRAPHICS
- Computer Graphics & CAD Fundementals £9.95
- Mastering Music £6.95

DISC DRIVE SYSTEMS
- Advanced Disc User Guide £16.95
- Disc Book £3.50
- Disc Programming Techniques £7.95
- Disc Systems £6.95
- File Handling on the BBC £6.95
- Discovering Disc Drives .... £POA
- Practical Disc File Techniques £5.95
- Mastering the Disc Drive £12.95
- Mastering DOS plus £12.95

APPLICATIONS
- Interfacing Proj for BBC £6.95
- BBC and Small Business £5.75
- The Software Business £5.50

Mastering Operating System (David Atherton) £6.95

WYSIWYG PLUS

WYSIWYG PLUS is a printer and screen utility for Wordwise Plus, View, Interword, and Basic users, supplied on a 16K Eprom. To obtain a particular printer effect, such as enlarged text, it used to be necessary to discover the appropriate 'printer control code' from your manual and incorporate it into your text. Secondly, you had to print several trial copies in order to position the effect correctly in relation to the rest of your text.

WYSIWYG PLUS simplifies this trial and error approach using easily remembered *commands. For example, *ENLARGED not only selects enlarged text on your printer, but uniquely shows you double width characters on your screen, even from within Wordwise Plus!

WYSIWYG PLUS incorporates a logo editor. Just draw your design on screen using the arrow keys, and save the results. Use the *GRAPHICS command to incorporate your design anywhere in your text; position and see your design in your text before faithfully reproducing a hard copy.

There is also special help for daisy wheel users. The *WHEEL command will prompt you to change daisy wheels whenever a change in type style is about to occur.

WYSIWYG PLUS is designed to work with the following systems:

BBC Model B	6502 Second Processor,	BBC Master 128	All printers (Except lasers)
BBC Model B+	Turbo coprocessor	BBC Compact	

WYSIWYG PLUS workspace is relocatable.

MAYA TERMINAL EMULATOR

A comms package for the professional user. MAYA emulates DEC VT52, VT100 and Tandberg TDV2215. Special BBC VDU mode allows full access to the BBC VDU driver.

Menu driven software allows the setting up of parameters and function key definitions which can be saved to disc for future use.

Flexible command parser provides a uniform user interface and allows full access to * commands and HELP facilities.

Xmodem and Kermit file transfer protocols are included as standard. Unique feature of MAYA is that Kermit can also be used in 'remote mode', which allows file transfers to be initiated by other computers connected to the BBC. File transfers can also be done with a 'dumb' ASCII protocol. Open architecture allows for expansion and addition of new features. Options currently under development are graphics drivers for Tektronix 4010/4014 emulation, TDGR driver for TDV2215 and a Viewdata patch (provisional version included in the current issue). Registered users will be provided with regular updates and customisation service will also be available to those interested.

The package comprises of a rom, utils disc and a comprehensive manual. It is compatible with Master, Models B & B+. It supports DFS, ADFS, NFS and ANFS filing systems.

BLACK QUEEN

A contract bridge program from BBC Publications both for beginners and for club players. Features include rebid and/or reply of any deal just played. Deals can be saved to a disc. Unique feature of Black Queen is its ability to construct deals from standard or classic ones in newspapers etc.

Compatible with Master, B and B+ **£13(d)**

EDUCATIONAL/FUN SOFTWARE BUNDLE

Wordmover, Wordplay, Pantry Antics, Drawstick, Locomotion

These programs are supplied from the BBC Publications Educational Software range and will be supplied on a 5.25" disc for BBC Master, B+ and B and on a 3.5" disc for the Compact.

5.25" Disc £17.50(d)
3.5" Disc £18.50(d)
(Normal RRP over £40)

VU-TYPE

Do you have finger trouble when typing?
Do your letters look like this?
Dear Sor,
I wuold like to...
then you need:

VU-type, a complete touch typing program produced by BBC/Pitman.

It allows you to learn at your own pace and has a wide range of exercises. Screen displays show the keys you have pressed and it will report on your speed and accuracy.

Supplied on a 40T Disc with a manual.

Available at a special price of £7.50(d) instead of the usual £15. Offer valid while stocks last.

BISMARCK

An enthralling game of strategy involving the famous German battleship of the same name.

You can play the role of British Navy in its quest to find the Bismarck and sink it or take either British or German role against another player. It requires the highest qualities of judgement, observation and decision to plan strategy and tactics to plot the death of Bismarck. **£13(d)**

PRINTER ACCESSORIES

EPSON ACCESSORIES:

Interfaces
- **8143** RS232 .... £30 (d)
- **8148** + RS232 + 8k .... £65 (d)
- **8177P** NLQ for FX80 +/FX100 + ... £99 (d)

Parallel & Serial Buffers of various size also available.
- **LQ800** Tractor Feed .... £47 (b)
- **LQ1000** Tractor Feed .... £52 (b)

SHEET FEEDERS:
- **LQ800** .... £135 (b)
- **LQ1000** .... £179 (b)
- **EX800** .... £135 (b)
- **EX1000** .... £309 (b)
- **FX800** .... £135 (b)
- **FX1000** .... £179 (b)

Ribbons:
- RX/FX100/100 +, FX105 .... £7 (d)
- RX/FX80/80 +, FX85 .... £4 (d)
- LX80/LX800 .... £4.50 (d)
- LQ800 .... £8.50 (d)
- LQ1000 .... £10 (d)
- EX800/1000 .... £7.50 (d)
- H180 Pen Set (Aqueous/Ball point) .... £8.25 (d)

HITACHI 672 Plotter
- Aqueous Pen Set six pens .... £18.50 (d)
- Oil Based Pen Set six pens .... £25.00 (d)

TAXAN CANON Accessories:
- Ribbon, KP810/815/910/915 .... £6 (d)

Star Printer
- NL10 Sheet Feeder .... £52 (b)
- NL10 Ribbon .... £4.50 (d)

National Panasonic KX P1080/81
- Spare Ribbon .... £4.50 (d)
- KXP3131 Tractor .... £90 (a)
- KXP3131 Sheet Feeder .... £189 (a)

JUKI 6100
- Tractor Feed .... £149 (a)
- Ribbon (Carbon) .... £2.00 (d)
- Sheet Feeder .... £219 (a)

BROTHER HR20
- Tractor Feed .... £116 (a)
- Spare Ribbon Nylon .... £3.00 (d)
- Spare Ribbon Carbon .... £4.50(d)

INTEGREX INK JET COLOUR PRINTER
- Spare Ink Cartridge Black .... £9 (d)
- Spare Ink Cartridge Colour .... £15 (d)
- Paper Roll .... £7 (d)

Printer Leads:
- BBC Parallel Lead (1.2m) .... £6 (d)

PAPER & LABELS

Plain Fanfold paper with micro perforations:
- 2000 sheets 9½" × 11" 60 gsm/sq m £12 (£3.50)
- 2000 sheets 14½" × 11" 60 gsm/sq m £18.50 (£4.50)
- 1500 sheets A4 90 gsm £18 (£3.50)

Labels/1000:
- Single Row 3½ × 1 7/16" .... £5.25 (d)
- Triple Row 2 7/16" × 1 7/16 .... £5 (d)

TECHNOMATIC

17 Burnley Road, London NW10 1ED Tel: 01-208 1177

NOVACAD

Computer Aided Draughting for the BBC Micro

"Novacad can drive a plotter to provide drawings of a high quality... Novacad is excellent. It is flexible, genuinely easy to operate without much practice, and a pleasure to use." **Beebug December 1986**

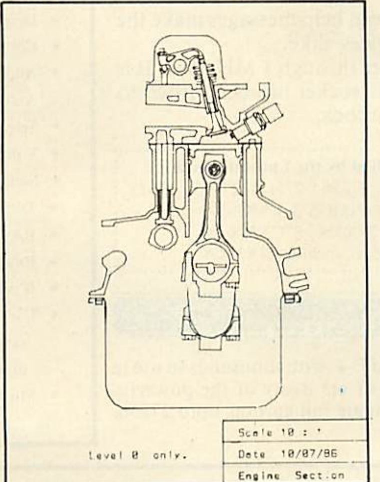
"Novacad is a professional package, well worth the £90 for the ROM and disc and is expandable to suit your own particular requirements. I would have no reservations if I heard Novacad called, "the best on the market"." **A&B Computing August 1986**

A sophisticated CAD package with unique facilities which are generally confined to the professional CAD packages costing thousands of pounds.

NOVACAD is being used in widely differing fields ranging from leading British industries for producing engineering drawings to Accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing professional quality output are making extensive use of NOVACAD's unique features. NOVACAD is proving to be a invaluable teaching aid in technical schools and colleges simply because of the ease with which it can be used.

NOVACAD'S MAJOR FEATURES

* Simple and easy to use with logical command sequence.
* A large drawing area (approx 1·5 screens).
* The ability to create complex icons (upto 500 lines instead of the usual 15 to 20 pixels), store them in a library and recall them at different scales and orientations.
* A zoom facility allowing magnification of up to 20 times to insert finer details.
* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi-layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique optional facility to output to any BBC compatible plotter.
* Cursor control from keyboard, tracker ball or mouse.



NOVACAD is compatible with all BBC models fitted with Acorn DFS. It has minimum hardware requirements of a single drive and a Epson compatible printer to get started though NOVACAD will utilise fully a dual drive system and 6502 2nd processor or the shadow ram on the B+ series. To obtain high quality drawings we recommend a BBC compatible plotter and our plotter driver generator.

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.

6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

NEW REDUCED PRICE

£49(d)

Plotter Driver Generator £15(d)

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.

BBC SPARE PARTS

BBC B & General

Power Supply	£52.00 (b)
Keyboard Connector	£5.00 (d)
Complete Keyboard	£52.00 (b)
Keyswitch (state type)	£1.75 (d)
Modulator UM1233	£4.80 (d)
Video ULA	£18.00 (d)
Serial ULA	£14.00 (d)
ADFS ROM	£26.00 (d)
6502A	£5.50 (d)
17.734 MHz Xtal	£2.50 (d)
16 MHz Xtal	£2.50 (d)
6522A	£5.50 (d)
6845SP	£6.50 (d)
DS3691	£4.50 (d)
88LS120	£6.50 (d)
LM324	£0.45 (d)
SAA5050	£9.00 (d)
UPD7002	£7.00 (d)
NE555	£0.50 (d)
68B50	£2.50 (d)
74ALS245	£5.00 (d)
WD1770	£24.00 (d)
68B54	£8.00 (d)
75159	£2.20 (d)
76489	£4.00 (d)

BBC B +

Keyswitch (state type)	£1.75 (d)
Modulator UM1233	£4.80 (d)
B+ OS	£18.00 (d)
PAL16RH	£18.00 (d)

BBC MASTER

Power Supply	£65.00 (b)
Keyboard Connection	£3.75 (d)
Keyboard	£65.00 (b)
Keyswitch (state type)	£1.75 (d)
1 Mb OS ROM	£39.00 (d)
CF30060 ULA	£10.00 (d)
CF30047 ULA	£15.25 (d)
CF30048 ULA	£15.25 (d)
CF30049 ULA	£15.25 (d)
CF30050 ULA	£19.75 (d)
CF30058 ULA	£15.00 (d)
6818	£4.00 (d)
65SC12	£15.66 (d)
50464	£3.50 (d)
74F00	£1.00 (d)
74F74	£1.40 (d)
74HCT253	£3.50 (d)
9637	£2.00 (d)
32.768 MHz Xtal	£2.00 (d)

2nd PROCESSORS

ULA (512)	£34.00 (d)
ULA (6502 & Z80)	£28.00 (d)
Power Supply	£42.00 (b)

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Please add carriage
(a) £8.00 (Courier)
(b) £2.50
(c) £1.50
(d) £1.00

EpromRyter

***Highly sophisticated & Advanced Programmer**

***Handles all current single rail Eproms**

***State of the Art Programming Algorithms**

EpromRyter is a powerful eprom programmer designed for use with the BBC Master Computer. It takes full advantage of the latest developments in the eprom technology and the extra facilities on the Master to provide fast, simple and efficient programming and editing facilities.

The software is totally menu driven and on screen help messages make the programming simple for both specialists and novices alike.

The EPROMRYTER interfaces with the Master through 1 MHz bus. It is mains powered with its own psu. 3M Textool zif socket has been fitted to ensure consistent and reliable service over long periods.





The single rail eproms handled by the EpromRyter are:
● 2716 2732 2764 27128 27256 27512 27513 27011 2516 2532 2564 (NMOS & CMOS)
● One time eproms P27XXX, 87CXXX etc.
● Also A suffix eproms such as 27XXXA

The main features of the programming software are:

* Device, function and voltage selection from the computer keyboard.
* Continuous display of the options selected.
* All eproms upto 27512 (64K) programmed in single pass.
* Automatic Intelligent identifier support for eproms able to respond.
* Selectable programming voltage 25/21/12.5V
* 3 programming methods: Normal, Intelligent & Pulse (30 sec for a 27128).
* Serial port protocols supported incl Intel Hex & Motorola S.
* DFS, NFS, ADFS and Rom Filing System Supported.
* BASIC/Machine Code programming using RFS.
* Powerful editor with input in HEX or ASCII. * Full editable 64K file.
* Block move of data within the address range.
* User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
* Multiple loading for ROM Filing System

Some of the above features apply to Master Computers only

EPROMER II

A proven Eprom programmer for BBC Model B and B+ with thousands in use in industry, educational and R&D establishments. It offers many of the powerful features of the EpromRyter and can program all single rail eproms upto 27256. Full details on request.

META Version III

"All the good features you would expect to find in a good source code editor are present . . . Meta assembler lives in a different world. It is structured to work with any new processor . . . as new instruction sets can be added . . . as needed . . . has a well featured editor with colour highlighting, a sound modular approach." Acorn User October 1986

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc — and 68000 — using native mnemonics for each processor, eg. LD A, (HL) for Z80 and MOV AO, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassemblers.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc — all **during Assembly.**
- Over 50 directives included as standard: handling nestable macros, conditional assembly and twenty types of table definition directives.
- 32 bit labels; 31 character names. Arithmetic and Boolean arithmetic to 32 bits.
- Modular source code with numeric and string parameter passing.
- Serial communicator area with eight options lines: echo, control code trap, LF supression/addition etc.
- Over 500 in use throughout the world in universities and many different industries.
- Two 16K Roms, two 80 track discs, A4 ring-band manual, function-key strip.

PORTAL EPROM EMULATORS

- Emulates 2716, 2732, 2764, 27128, 27256, 27512 eproms at 150ns Access time.
- Load at 4Kbytes/second — No "erase" time.
- 28 pin header plugs into Eprom socket on target system — status monitored on 13 Leds.
- Fully software controlled from Meta Assembler.
- 100 times faster than standard EPROM program/erase cycle.
- Fully CMOS compatible; draws no power from target system.
- Four portals may be independently programmed off same user-post cable.
- Complete with all cables, manual and disc.

PORTAL 512 (2716, 2732, 2764, 27128, 27256, 27512).

TEAM DISSASSEMBLER

The third part of the Universal Development System: a Meta labelling dissassembler.

Supports 1802, 8080, 8085, HD64180, Z80, 65XX (includes 65 col, 6511 etc), 68XX (includes 00, 01, 02, 03, 08 etc):

- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
- Pre-editing stage allows marking of object code areas as byte, string, word, long word etc, tables. These areas dis-assembled into appropriate directives instead of garbage mnemonics.
- Reconstituted source code ready for immediate re-assembly by META.
- Omniversal search/replace for re-naming arbitary label names with meaningful ones.

NEW

THE TECHNOMATIC BBC CATALOGUE
REVISED WINTER CATALOGUE

This advertisement can only show an example of the range of products stocked by Technomatic. So send for our latest BBC catalogue providing detailed information and prices on BBC Computer Systems, Peripherals, Software and Books. To obtain your free copy please complete and return the coupon below.

Technomatic is a BBC Computer and Econet Referral Centre providing a professional and reliable service to the BBC user.

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4/88

Return to Technomatic Ltd, 17 Burnley Road, London NW10 1ED

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989
Shop Hours: 9am to 6pm (Mon.-Sat.) Thursdays 9am to 8pm
All prices exclusive of VAT; subject to change without notice & available on request.
Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn The choice of Experience


The choice before and after the experience

Archimedes micro

A Computer for BUSINESS, RESEARCH, EDUCATION & HOME USE

ARCHIMEDES PRICES

305 Series
- Entry System £699
- with Green Monitor £749
- with Colour Monitor £899

310 Series
- Entry System £775
- with Green Monitor £825
- with Colour Monitor £975

310M Series
- Entry System £835
- with Green Monitor £885
- with Colour Monitor £1035

410 Series
- Entry System £1339
- with Green Monitor £1449
- with Colour Monitor £1599

440 Series
- Entry System £2299
- with Green Monitor £2349
- with Colour Monitor £2499

(Securicor carr. £7 on Micros)

- 0.5 Mb RAM for 305 £85
- Podule Backplane £37
- ROM Podule (Computer Concepts) £49
- Archimedes Ref Manual £29
- ARM Assem. Lang Prog Manual £12
- **2nd 800K floppy disc drive (for 305, 310 & 410)** £125
- Econet Network Board £43
- Backplane for 2 podules, with fan (305, 310) £39
- I/O Podule (with User port, Analogue port & 1MHz bus) £79
- MIDI add-on to I/O Podule £29
- ROM Podule (takes five 8 bit ROMs, of 16, 32, 64 or 128K) £59
  - Real time Video Digitiser (Watford) TBA
  - Sound Sampler (Armadillo) £78

WORDPROCESSORS

Wordwise +	£20	View	£50
Image-Writer	£26	Viewspell	£32
Interword ROM	£39	ViewIndex	£13

DATABASES

System's Delta Plus £60
AlphaBase £43
Viewstore £52

SPREADSHEETS

Intersheet ROM £39 Viewsheet £50

BUSINESS GRAPHICS

Interchart ROM £25
GammaPlot £30

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics £95

GRAPHICS, ART & DESIGN

Interchart	£25	Gamma Plot	£30
Artisan	£34	Gamma Plus	£60

GAMES

Zarch £17
Toolkit (Beebug) £33

PC EMULATION Pack

(for 310, 410 & 440), including MSDOS 3.21 £89

LANGUAGES

ANSI 'C'; ISO-PASCAL; FORTRAN 77; Cambridge LISP; PROLOG X £95 each
TWIN EDITOR £29

0% (APR) FINANCE

*For a limited period, Watford Electronics are able to offer the Archimedes range of microcomputers at **0% (APR)** finance. Credit facility available subject to status. Please inquire for further details.*
(Watford Electronics are Licenced Credit Brokers)

NEW

CREDIT TERMS now available. Please telephone or write in for further information.

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with two disks, one 5.25" for the BBC, the other 3.5" format for the Archimedes, and the necessary cable to connect the two computers. Using this package it is possible to transfer any data from the BBC to Archimedes at upto 19200 baud.
By far the easiest way to transfer data to your new computer.

Only £25

Archimedes 5¼"/3½" Disc drive Interface

With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. Upto FOUR drives can be connected and NO SOLDERING is involved. Supplied complete with necessary lead.

Only £25

Note: This is not simply a lead. Attempting to connect an external disc drive by direct connection may result in damage to your Archimedes.

Archimedes Printer Lead £8.50
Archimedes Monitor Lead £7.50

BBC MASTER

BBC MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMINAL **£379**

SPECIAL OFFER

FREE . . . £105 worth of Hardware & Software

*Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control and **Watford's** 3½", double sided 1 Megabyte (unformated) single disc drive complete with cables, ready to connect to the micro – with every BBC Master purchased from us this month.*

BBC MASTER with Turbo Board + above SPECIAL OFFER **£475**
512K Processor Add on Board "inc. Mouse and GEM package" £185
BBC AIV (Domesday) System **£4479**

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£95
Econet Module for the Master	£40
Twin ROM Cartridge for Master	£7.50
Quad ROM Cartridge for Master	£12
Universal Processor Adaptor	£75
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref. Manual	(No VAT) £19
64K Upgrade Kit for B+	£32
Acorn 1770 DFS Kit complete	£41
ECONET Upgrade Kit for BBC	£42
ALL ECONET UPGRADES Available	
ARIES' Professional IEEE Interface	£238
Acorn IEEE Interface Complete	£265
Morley Teletext Adaptor with ATS Rom	£99
Filestore E01	£825
Filestore E02	£705

BBC MASTER COMPACT

All Master Compact Microcomputers are supplied complete with an integral 3½" Disc Drive and various educational and professional bundled software.

System 1	Standard Package	£310
System 1A	System 1 + TV Modulator	£322
System 2	System 1 + Green Hires Monitor	£364
System 3	System 1 + Medium Res Colour Monitor	£478

RS232 Kit for BBC Compact £25
Additional 3½" Drive for BBC Compact £90
(Securicor carriage £7)

Watford Electronics are the main Approved Stockist of ACORN SPARES and ECONET Referral Centre

The 80186 Co-Processor

This package consists of the Master 512 board, Watford Co-Pro Adaptor, 1770 Disc Upgrade and Acorn ADFS. The Master 512 board using the 80186 16 bit Processor at 10MHz and running Digital Research DOS Plus, gives a high degree of IBM compatibility at an extremely reasonable price. Included in the 512k package is a mouse and the amazing Digital Research GEM suite of software; GEM Paint, GEM draw and GEM desktop giving a complete Mouse Icons environment (All other GEM packages will work on the 512k). Famous packages that will work with the 512k board include Wordstar, Dbase II, Lotus 123 and many others. The only requirement to upgrade any BBC Model B to this system is you must have twin 80 track disc drives.

£259

65C102 2nd PROCESSOR

(65C102 replaces the original Acorn 6502 2nd Processor)

This amazing package consists of the Acorn 65C102 'Turbo' Board, the Watford Co-Pro Adaptor and Acorn 1.2 DNFS ROM. The 'Turbo' board, running at 4MHz with 64k of additional RAM will increase the speed by between 50 and 200% depending on the application running, and allow a BASIC program of upto 44k in any screen mode. Simply by plugging in the Co-Pro and the DNFS ROM with its special Tube host code and you massively increase the power of any Model B.

£135

Z88 Sinclair's Portable Micro



Price:£239

FREE

As an introductory offer, we are giving away, 4 rechargeable batteries and a compact Mains Battery Charger absolutely FREE with every Z88 bought from us this this month.

ACCESSORIES

Mains Adaptor	£8.65
32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K EPROM Pack	£43.40
Z88 BBC or PC Link	£21.70
Z88 EPROM ERASER	£34.75
Serial Printer Cable	£8.65
Parallel Printer Cable	£24.00
Z88 Modem	£86.90
AA Nicad Rechargeable Battery	£1.50
Battery Charger, Compact & Fast (3 Hours)	£6

SPECIAL OFFER

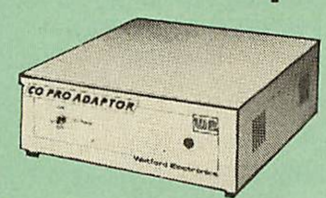
EPROMs for BBC's Sideways ROMs.

2764-250nS £3.00
27128-250nS (12V5) £3.25
27128-250nS (21V) £4.25

RAMs (Low power) for ATPL, WATFORD, etc.,
Sideways ROM Boards

6264LP (8K) £2.75
2 × 6264LP (16K) £5.30

CO-PRO Adaptor



Now for the first time you can add the Master Co-processor boards, to your standard BBC model B, or B Plus. With this brand new launch from Watford Electronics you can attach any BBC Master co-processor to the original BBC Micro. Once again Watford strides ahead with a new concept in BBC B Micro add-ons. This unique external Co-Pro Adaptor, is protected by patent applications.
Use the super fast Turbo Board with your BBC B, it is much faster than the 6502 2nd processor superseding it.
With the 512K addon your standard BBC machine achieves IBM PC compatibility at a realistic price running GEM, Lotus 123 and many other programs. Included with the 512k package is a high precision mouse and the Digital Research GEM suite of software; GEM Desktop, GEM Write GEM Paint. This requires both the 1770 DFS and the ADFS to be fitted to your computer.
To use other co-processors you require a BBC B with DNFS 1.20 or higher, or BBC B+ fitted with 1770 DFS 2.20 or greater. Co-processors work exactly like a second processor.
Master owners may use Co-Pro to add a second Co-processor externally.
Watford, brings power to your BBC at only:

£35 (carr £5)

NEW

BBC PCB DESIGNER

At last! A PCB design package for the BBC Micro that eclipses some industry CAD software. Hard to believe, isn't it? Just look at some of the impressive package specification:

- Library Component Designer
- Component Library (over 200 parts)
- Component List Editor
- NetList Editor
- PCB Board Designer
- Plotter Driver
- Dot Matrix Printer Driver

This integrated suite of programs is packed full of sophisticated PCB related features making the design of a circuit board a dream instead of a nightmare.

Input for the design may be manual, taking components from the library and connecting them, or highly automatic starting from a netlist and list of components. In auto mode, PCB Designer will never allow you to forget a connection again! And of course, either in manual or auto mode, connectivity is maintained no matter how you later move the parts around and route the tracks. Connections snap together and angles are corrected, Through hole vias and track thickness are established automatically and many more features, far too numerous to mention here, are included in the system.

Some of the PCB Designer's features are:

- Over 120 library pad sizes/shapes
- Four colour adjustable palette
- Zoom range 2:1 to 1:4
- Highlighting of specific tracks
- Normal and surface mounted components
- Rapid screen review
- Menu driven
- Variable gridlock
- Switchable measurement grid
- Pre-select pan/scroll facility
- Large 24" x 24" Board size
- Copy route facility
- Connectivity held at all times
- Ratsnesting of part connections
- Auto-plaement of text references
- Text linked to parts
- Automatic placement of vias
- Printer and plotter outputs provided
- Comprehensive manual

TYPES OF PLOT OUTPUT

Top and bottom track artworks, top and bottom silkscreens, solder resist mask, drilling detail drawing and check plot. All these may be with pad holes on/off, scale of 2:1 or 1:1, board edge on/off, 90 degrees rotation, mirror image, width of pen, x & y offsets and batch plots to disc.

The above is only a taste of the superb features of this software, surely capturing previously unknown performance from the BBC Master computer. BBC B owners will need to fit at least one block of sideways RAM, Shadow screen memory and a disc drive. A trackerball or a mouse is also required.

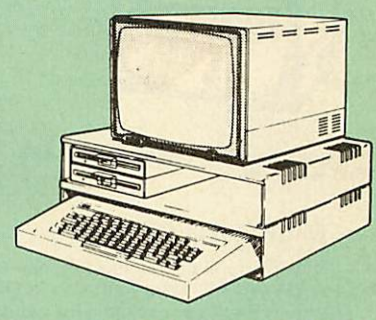
BBC PCB Designer is supplied on a 32K PAL PROM and comes complete with two discs and a comprehensive manual containing examples and useful information on PCB design.

By the way, as a bonus, PCB Designer is also suitable for many other schematic drawing applications such as circuit diagram drawing.

Introductory Offer: £99

(Please write in for further technical details)

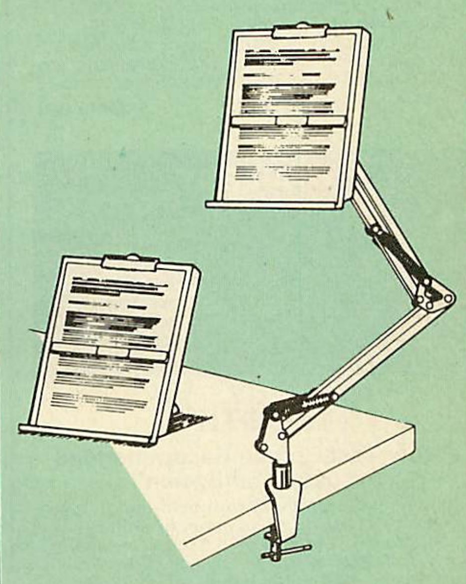
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£19** (carr. £3.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£24** (carr £3.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a plastic retaining ruler and a clip grip. Both units are full A4 size.

Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

Continued





All Monitors are supplied complete with BBC connecting leads FREE.

MICROVITEC 14"

- 1431 – Standard resolution as used on the BBC television computer programme £175
- 1451 – Medium resolution, suitable for word processing in mode 0 £225
- 1441 – High res, exceeds the capabilities of the BBC micro £359
- 1431AP RGB + PAL and AUDIO £199
- 1451AP RGB + PAL and AUDIO £255
- **2030 CS 20" Med Res £380**
- **2040 CS 20" Hi Res £675**
- Dust Cover for Microvitecs £5.50
- Touchtec 501 Touch Screen £239

TAXAN 12" & 14"

- **TAXAN Super Vision 2 Type 620** Hi-res RGB Colour monitor. Ideal for Wordprocessing £269
- **TAXAN Super 3, Type 625** Ultra Hi-res, RGB Colour) Text mode switch allows monochrome text display in Green, Amber, White reverse or White on Blue £319
- **TAXAN 14" Multisync 770 Plus** – An autoscanning Ultra high res, colour monitor. Ideal for Archimedes £449

- **NEC JC-1401P3EE 14"** Multisnc Ultra Hi-res Intelligent Colour monitor. Auto scans frequencies between 15KHz to 35KHz. Text switch provides 7 colours for Database & wordprocessor. £495
- **Philips BM7542 12" Paper White Monitor.** Attractively finished high res monitor. Has an etched glass anti-glare screen and a tilt stand for optimum viewing angle. 1000 x 850 pixels resolution coupled with high contrast makes it ideal for both word pro and graphics. The paper white display is ideal for DTP and CAD. Has a Video/Audio input. **Only £69**

STAR BUY

- **PHILLIPS 14"** Hi-Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display.

ONLY £195

ZENITH

"Now Test Bureau Recommended for use in Education"

12" high resolution monochrome monitor. Ideal for word processing as its green or amber screen is very restful to read. (These are the same professional quality, stylishly finished monitors as used in the larger Zenith PC Sys.)

- **Green (New Design) Hi-resolution £66**
- **Amber (New Design) Hi-resolution £70**

N.B. carriage on Monitors **£7** (securicor)

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3

SWIVEL BASES

for Video Monitors

Our professional type swivel bases have front adjustable control. This alleviates the need to lift the monitor when adjusting the viewing angle.

for 12" Monitors **£9** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti-Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for all wordprocessor users. Hundreds of these screens are in daily use in various branches of one of the leading High Street banks. **£12**

Acorn-Olivetti JP101 Ink Jet Printer

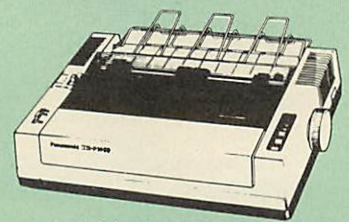
One of the main problems with most printers is that they are hopelessly noisy. How often have you wanted to print something late at night but not done so for fear of waking the children? Also ideal for those working in quiet environments such as libraries, etc. Silence the complaints with the serious solution from Watford at the amazing cost of only **£59**
(Offer valid while present stocks last)

JP101 accepts 9½" standard fan fold paper or single A4 sheets. Tractor & Friction feed supplied as standard – print speed 50 cps.

Pack of 4 refills **£10**

Screen Dump ROM for JP101 £12

Panasonic KX-P1081



Attractively finished in BBC beige. Bi-directional, logic seeking. Has IBM and Epson RX compatible command calls. Speed: 120CPS draft mode, 24 CPS NLQ mode. Character width range from 5 cpi to 17 cpi. Upto 40 downloadable characters. Functions include, Proportional spacing, Justification, centering and left & right ranging.

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Special Price: **£149** (carr. £6)

Optional RS232 Interface: £39

Panasonic KX-P1082

This superb printer is very similar to the popular KX-P1081 printer but at 160 cps (40 cps in NLQ), a lot faster.
(Our LOW price also includes £35 worth of FREE BBC Cable and Dump Out 3 ROM).

Introductory Offer: **£175** (carr. £7)

Panasonic KX-P3131 Daisy-Wheel Printer

This low-cost high-performance Daisy Wheel printer is ideal for anyone wishing to produce clear, immaculate letters or reports. It delivers, flawless text at 10, 12 & 15 CPS. Supports proportional spacing. Is Bi-directional. logic seeking. Printing speed: 17CPS. Has 6k printer Buffer. A printer of similar spec could cost a lot more than our ridiculously low price of:

Only **£239** (carr. £7)

Single Sheet Feeder	£175
Tractor Feed	£90

FREE 32K extra Printer Buffer with every KX-P3131 purchased from us this month.

NEC P2200 PINWRITER

24 pin head; 168 CPS, LQ 56 CPS, 8K Buffer, Tractor/Friction feed. Numerous typefaces. **£285**

Cut Sheet Feeder **£59**

NEC P660 PINWRITER

24pin; 216 CPS, LQ 76 CPS, 8K Buffer **£425**

VARIOUS PRINTERS & ACCESSORIES

- Brother HR15 RS232 Daisy Wheel **£275**
- Brother HR20 Daisy Wheel **£349**
- Epson EX800 Printer **£395**
- Epson EX1000 Printer **£539**
- Epson FX800 Printer **£295**
- Epson FX1000 Printer **£399**
- Epson LQ800 Printer **£399**
- Epson LQ850 Printer **£439**
- Epson LQ1050 Printer **£529**
- Epson LQ2500+ Printer **£790**
- Epson LX800 Printer **£186**
- Epson SQ2500 Printer **£899**
- Epson Paper Roll Holder **£17**
- EX800/1000 Colour Option **£55**
- EX800/1000 Colour Ribbon **£18**
- EX800 Cut Sheet Feeder **£130**
- EX1000 Cut Sheet Feeder £195
- FX/LQ/LX800 Single Sheet Feeder **£135**
- FX/LQ1000 Single Sheet Feeder **£169**
- Hi-80 Refills – Set of 4 Pens **£7**
- LX800 Cut Sheet Feeder **£75**
- LQ800 Tractor Feed **£44**
- LQ1000 Tractor Feed **£50**
- LQ2500 Cut Sheet Feeder **£195**
- LX1000 Cut Sheet Feeder **£305**
- **Hitachi 672 Colour Plotter £475**

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£27**	RS232 + 2K Buffer	**£52**
IEEE 488	**£65**	RS232 + 8K Buffer	**£62**

KAGA/TAXAN PRINTERS

(IBM/Epson compatibles)

Kaga KP815 Printer	**£249** (carr £7)
Kaga KP915 Printer	**£350** (carr £7)
RS232 Interface.	**£49**
RS232 Interface with 2K Buffer	**£69**
RS232 Interface with 16K Buffer	**£89**

INTEGREX COLOUR JET PRINTER

- Colour Jet 132 Printer **£525**
- Paper Roll **£6**
- Screen Dump Software **£10**
- Colour Cartridge **£14**
- Black Cartridge **£8**
- 100 A4 OHP transparencies **£55**

PRINTER SHARERS

(Ideal for School environment)

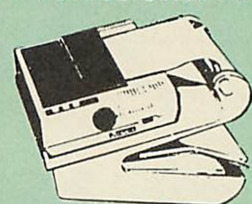
Connects	Serial	Centronics
2 BBC Micros to 1 Printer	£25	£27
3 BBC Micros to 1 Printer	£36	£35
6 BBC Micros to 1 Printer	–	£99

PRINTER CHANGER

3 Printers to 1 Micro (Centronics) **£65**

(Cables extra, specify type required when ordering)

Professional Printer Stand



This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

£26 (carr. £2.50)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

PRINTER LEADS

Centronics lead to connect BBC micro to EPSON, KAGA, SEIKOSHA, NEC, STAR, JUKI, BROTHER, SHINWA, Panasonic etc. printers.

Standard length (4 feet long)	£6
Extra long (6 feet long)	£8
Compact's Special Centronics Lead	£9
RS232 Cable	P.O.A.
IBM Parallel 1 metre Cable	£9

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Brother HR15/20	£3.00	£5.00
EX/LQ800	£7.50	£4.50
EX/LQ1000	£8.00	£5.00
RX/FX80/85/800/MX80	£4.00	£4.95
RX/FX100/1000	£7.00	–
Kaga/Texan KP810/815	£5.25	£4.00
LQ2500	£9.00	£5.50
LX80/86/800	£4.00	£4.50
M1009/GLP	£4.00	£3.75
Panasonic KX1080/81	£4.50	£4.75
SQ2500	£25.00	£5.50
Star NL10	£4.00	£4.50
Microvitec Metal	–	£5.50

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Listing Paper (Perforated)

1,000 Sheets 9½" × 11" Fanfold Paper	£7
2,000 Sheets 9½" × 11" Fanfold Paper	£12
1000 Sheets 9½" × 11" NCR 2 Part Fanfold	£19
1,000 Sheets 15" × 11" Fanfold Paper	£9
1000 Sheets true A4 Fanfold Paper	£11
2000 Sheets true A4 Fanfold Paper	£20
Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 × 36mm (Single Row)	£5.00
1,000 90 × 36mm (Twin Row)	£4.90
1,000 90 × 49mm (Twin Row)	£7.50
1,000 102 × 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

MEGABUFFER 256



This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. It allows the computer to print 256,000 character in a short time thus freeing the computer very quickly. In short it makes light work of printing large documents, screen dumps, etc. It is extremely simple to connect. The features are:

- Low Cost, High performance.
- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

In conclusion it can safely be said that MEGABUFFER 256 is the ultimate printer Buffer for both the amateur and professional user.

Only £125 (carr £2)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

New Launch Offers
Disc Drives DP35-800S



A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25 inch disk drive is 40/80 track switchable, and has its very own power supply running independently of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

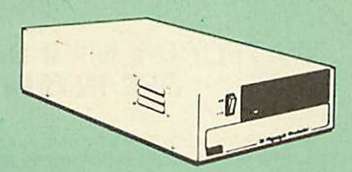
OKIMATE COLOUR PRINTER

The first ribbon transfer printer in its price range which offers fully versatile colour or black printing. A 24 element print head produces more than 100 shades with exceptional clarity. Ideal for use with Quest Paint or AMX Super Art.

Only: **£139**

BBC Screen Dump	£10
Colour Ribbon	£6
Black Ribbon	£6

30 Megabyte Winchester Drive



Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a full user guide and full utilities including file copy, 1000K save routines, Format and Verify – in fact all you need and more.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

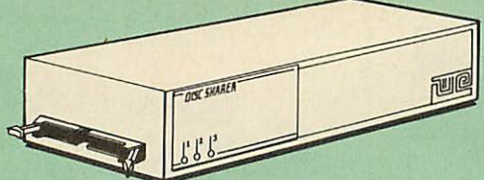
Compatible with the Master, and the BBC B (with 1770 disc interface).

Launch Offer **£449** (Carr. £12)

At last, it's here!
The Advance Reference Manual for the BBC Master
£19.95

NEW

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£59** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's SINGLE DENSITY DFS

Watford's popular and widely acclaimed DFS has now been available for five years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn DFS). (not Acorn's 1770 DFS)***

- *Complete Disc Interface Kit including DFS ROM and fitting instructions* **£52**
- *Acorn's 0.90 DFS Kit complete* **£54**
- *DFS Manual (Comprehensive)* (no VAT) **£6.95** *(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).*
- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DNFS ROM only* **£17** ● *ADFS ROM only* **£25**
- *Watford's DFS is exclusively available from Watford Electronics and their appointed dealers only. Every ROM carries a special label with LOGO and serial number.*

NEW

WATFORD's Mk II Double Density DFS INTERFACE

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our MkII DDFS board has been adapted to allow the use of Acorn ADFS as well.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

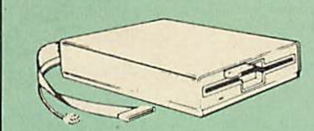
Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
  - We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

SPECIAL DISC DRIVE/DDFS OFFER

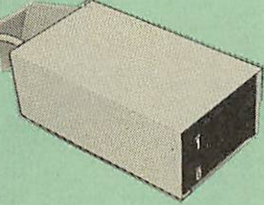
Type CLS400



- The popular Mitsubishi 400k Single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's popular *DDFS Disc Interface* (allows 720k storage). Will run in both Single and Double Density modes 40/80 track Software switchable.
- A comprehensive User Friendly Manual.

A Bargain at Only **£130** (£6 carr)
(Offer valid while stocks last)

3½" DISC DRIVE OFFER



These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

- Single 400K Drive **£69**
- Twin 800K Drives **£126**

Mysteries of disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

DISC ALBUMS

Attractively finished in antique brown leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket.

£4

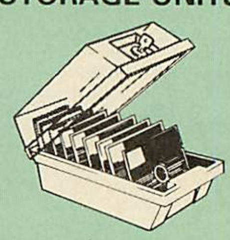
FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

£7

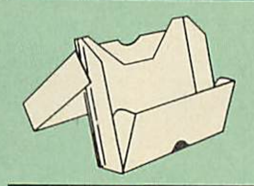
ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.



- **M35** - holds upto 50 5¼" discs **£6.00**
- **M85** – holds upto 95 5¼" discs **£8.00**
- **M25*** – holds upto 25 3½" Discs **£5.50**
- **M50** – holds 50 3½" Discs **£7.50**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.
Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. It holds up to eight 5¼" Discs.



Protection at Only: **£2**

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

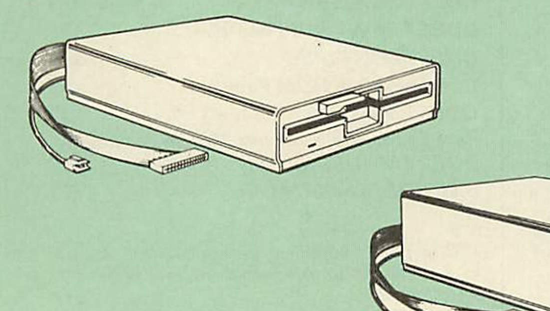
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 6th page of our advert for the Plinths).

P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £89		CS 200 £98	
400K (720K)	CLS400S £89	CLD 400 £168	CS 400S £99	CD400 £188
800K (1.44M)		CLD 800S £169		CD 800S £188

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

Prefix C = Cased Drive
L = Less PSU
S = Single
D = Double

Suffix ***S*** *= 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5¼" S/S D/D 40 Track Diskettes (744)* ***£8.00***
- *10 × 5¼" D/S D/D 40 Track Diskettes (745)* ***£9.75***
- *10 × 5¼" S/S D/D 80 Track Diskettes (746)* ***£12.50***
- *10 × 5¼" D/S D/D 80 Track Diskettes (747)* ***£12.75***
- *10 × 5¼" 1.6M D/S D/D High Density Discs for IBM XT and AT* ***£28***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£13.50***
- *10 × 3½" D/S D/D 40/80 track Discs* ***£15***



FREE This extremely useful and attractive Personal Leather Organiser worth upto £50 is yours when you buy from us, 5 Boxes of any of the 3M range of Discs that we advertise. Any of the above diskettes

TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box. We strongly recommend these Discs.

- *10 ×* ***M3*** *3½" D/S D/D 80 Track Discs* ***£15***
- *10 ×* ***M4*** *5¼" S/S D/D 40 Track Discs* ***£6.50***
- *10 ×* ***M5*** *5¼" D/S D/D 40 Track Discs* ***£8***
- *10 ×* ***M7*** *5¼" D/S D/D 80 Track Discs* ***£9***
- *3" Double Sided Discs* ***£3 each***

Special BULK OFFER on 5¼" DISCS



(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

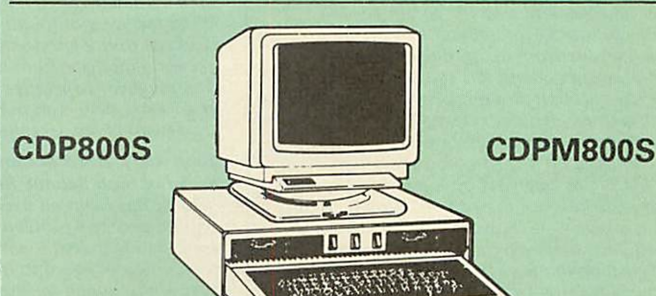
Type	S-S 40T	D-S 40T	D-S 80T
● Without Sleeves	£35	£39	£45
● With Sleeves	£38	£42	£48

WATFORD's WINCHESTER DRIVES



- 10 Megabyte Unit with ADFS **£399**
- 30 Megabyte Unit with ADFS **£449**
- 40 Megabyte Unit with ADFS **£749**

CDP800S



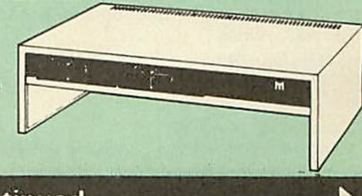
CDPM800S

Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £192
CDPM 800S for Master £196
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

ACORN'S Twin 800K Disc Drives



Specially mounted side by side in a Master Plinth. Supplied complete with Cables. Plugs directly to the Master Computer.

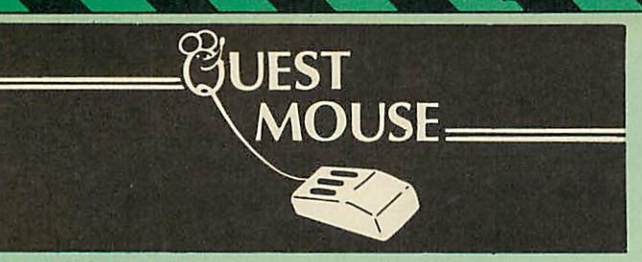
RRP £350

Our Price: Only £175
(carr £7)

Continued →

NOMINATED FOR





QUEST MOUSE

The ultimate in Mouse technology, the Watford Electronics Quest Mouse must be the most powerful Mouse package yet produced for the BBC Micro. Featuring state of the art 32K ROM software the Quest Mouse package is filled with features essential to the budding artist. The Quest Mouse is a high precision, low profile and large footprint mouse. It has three large comfortable buttons and its RUBBER COATED STEEL BALL is smooth and easy to use on virtually any work surface. This also eliminates any directional bias that one encounters on the most well-known mouse for the BBC. The Quest Mouse is FULLY HARDWARE COMPATIBLE with the AMX MOUSE so that it will work with any of the AMX range of software.

The two parts of the Quest package are available separately so that existing Mouse owners can upgrade to the Watford's sophisticated Quest Paint software or replace their existing worn out mice for a minimum cost.

QUEST PAINT

The Quest Mouse software is supplied on a PALPROM unit to allow the sophisticated 32K program to be used from a single ROM socket. It is compatible with the BBC B, BBC B Plus and BBC Master Series machines.

The software is used to draw high resolution Mode 1 pictures in full colour. All menu selection and control of the drawing process is performed with the mouse so that you will hardly ever touch the keyboard.

SOFTWARE FEATURES

The software is far too powerful for us to describe it fully in such a small space. Below is a list of the various features. Please write to us for a fully descriptive leaflet.

Disk interface not required. Utilities disk has facility to create and print big screens. Colours applied can be solid, either pattern of user defined pattern. Drawing can use brush or airbrush. Brush shapes can be defined and stored. Airbrush sprays colour/pattern randomly with four jet sizes and even or center spread. Colour cycles. Colour protection to stop particular colours from being overwritten by selected drawing actions. All standard drawing facilities like: rubber, straight pencil lines, triangles, circles, ellipses, rectangles, parallelograms, polygons, etc are provided. All shapes can be solid or just a boundary line. Once a shape has been set up it can be repeated anywhere on the screen. Global colour replace in a rectangle. Powerful fill facility for areas and vertical/horizontal lines. Full cut and paste of rectangular areas with rotation and size with screens from Watford Beeb Video digitiser. Load and Save screens with colour pallet information, save brush and pattern definitions etc.

Take The Guesswork Out of Selecting a Mouse Package

With reviews like this how can you go wrong.

Popular Computing Weekly, 9-11 June '87

"What you actually get for your money is a well built, three button mouse (far superior to the AMX mouse)."

"Overall the combination of a quality mouse and decent art package gives Watford Electronics a real chance of supplanting AMX as mouse supremos."

Micro User June '87

"Quest Mouse and Quest Paint can hold their heads high in the market. . ."

A&B Computing June '87

". . . Watford Electronics, a company famed for excellent hardware add ons and versatile software packages. Called Quest mouse, "this is a very special mouse driven drawing package..."

". . . you will have one of the most comfortable and professionally built mice I have used in a long time. The buttons are responsive, the mouse movement is smooth and without directional bias – a pleasure to use."

"What we have here is probably the best art package there is for the BBC Micro . . ."

"Quest Paint is a major leap forward in BBC programming. . ."

"Quest Paint is an original piece of programming, it is friendly and well endowed with many useful facilities. I would comfortably say it is easier to draw good pictures with Quest Paint than it is with more expensive 'Professional' art packages for the Atari ST and the Commodore Amiga. A recommended buy if you are looking for the best in BBC micro based art packages".

Acorn User, September '87

"The mouse (Quest) performs well in the face of competition from AMX, Wigmore and the rest . . ."

". . . this package represents excellent value for money. If you are interested in art then this program is for you to buy".

"Given time, I can see no reason why Quest Paint shouldn't take on the title of the definitive art package available for the BBC Micro to date".

"All in all, Quest Paint is a very professional package. It contains virtually every feature the budding artist could require".

"What makes Quest Paint so versatile is the addition of a sub-menu which allows you extensive control over each function".

"Until recently, Superart from AMS had been judged as the definitive mode 1 graphics package for the BBC micro. But now it has a serious rival in the form of Quest Paint, from Watford".

"As a measure of what is contained within Quest Paint, I would say it had all the features of Superart plus . . ."

"In most art packages, provision is given for drawing triangles and rectangles. Quest Mouse goes 14 better, allowing any regular polygon of upto 16 sides".

"One facility, not found on any other Art package to my knowledge, is the ability to access a digitiser from within the program". The reviewer concludes by saying, "The result is an extremely comprehensive and professional art package".

John Kilby, Head of Computer Science, Bishop Wulstan High School, Rugby, writes:

"Quest has been an excellent piece of equipment. The problem that seems to occur everyday is that at lunchtime the pupils rush to the computer room to make sure that they are first in the queue for the 'Quest' mouse".

Lt. Cln. C.G. Holton, G2 HQ 1 (BR) Corps, BFPO 39, writes:

"As ever your service is superb and the Quest Mouse proves every bit as good as the adverts claim".

Beeblet User Group, New Zealand Oct '87:

"One of its nicer features is that the top menu is done in Mode 0, the drawing itself is in Mode 1. Thus on screen together are two different Modes. A neat way around an old problem"

"PAN is used when a larger than one screen size image is required. The mind boggles at an A3 size drawing".

"I like it partly because of the mouse itself which is smooth and easy to handle but mainly I suppose because of the features I longed for and previously never got. Its easy to use with almost everything at your fingertips from the mouse. The software is simple where needed and complex where complexity is required".



Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

QUEST MOUSE & QUEST PAINT	***£59***
QUEST MOUSE, QUEST PAINT, AMX PAGEMAKER & PAGEFONT	***£85***
QUEST MOUSE ONLY	***£29***
QUEST PAINT SOFTWARE	***£32***
QUEST FONT DISC	***£12***
ConQuest 32K ROM Package	***£29***
QUEST MAT	***£3***
Part-exchange your old Mouse for a New QUEST MOUSE for only	***£23***
GXR ROM for BBC Micro	***£22***

N.B.

1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.

2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21

(Price includes FREE software Disc and Operating Manual)

RB2 Marconi Tracker Ball

RB2 (AMX/Quest compatible)	£59
RB2 including Quest Paint	£85

FLEET STREET EDITOR

Software pack for BBC Micro	£31
Software pack for the Master	£39
Software Pack for Compact	£40
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

Continued





ARIES CORNER

The Aries B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£80** (carr. £2)



CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries-B20 and the Aries-B32

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable "mother board" which carries the extension ROM sockets and a small "base board" on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price:		
	Aries B-12	£40
	Aries B-12C	£5

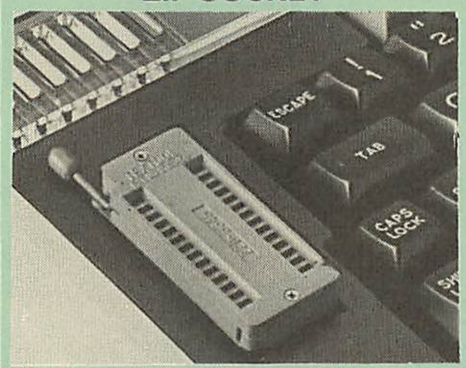
ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

All prices in this advert are exclusive of VAT.

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

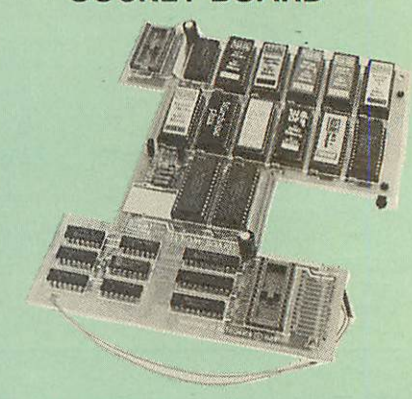
- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£18** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

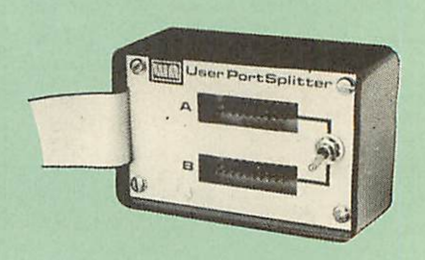
- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

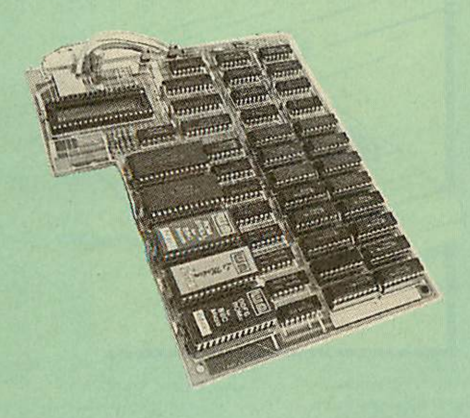
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£21** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM *£39*
- ROM/RAM card with 64k dynamic RAM *£52*
- ROM/RAM card with a massive 128k dynamic RAM £80

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £6
- 16k Dynamic RAM for Upgrade £7.50
- Battery backup £3
- Read and Write protect switches ...... £2 each

Complete ROM-RAM board
All options installed £89

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

Le Modem



The MODEM from Watford

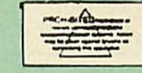
At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple "COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- ***FREE Registration to MicroLink.***

SPECIAL OFFER

Price: ***£94***
(carr £3)



(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Minerva Systems Software

System Delta with Card Index	£55
System Programmers Ref. Guide	£19
System Gamma	£43
System Gamma Prog. Ref. Guide	£19
System Mailshot	£17
System Reporter	£17
System Intrer/View Link	£17
System Sales Ledger	£39
System Purchase Ledger	£39
System Nominal Ledger	£48
System Stock Management	£39
Order Processing/Invoicing	£39

APOLLO



The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- **FREE Registration to MicroLink.**
- **£6.50 off annual Membership to Micronet, Prestel and Telecom Gold.**

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Only: **£94** **(Carr £3)**

Price includes, the Modem, Comm Software Cables & Operating Manual).
(Write in for full specification)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£12
Delta 3B Twin Joysticks	£17
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£12
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

ATTACHE CARRYING CASE

For the BBC Micro. Attractively finished in antique brown leatherette. Lockable.

Only **£10** (£2 carr.)

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued →

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
DISC DOCTOR	£28
Graphics ROM	£23
TERMI	£25
COMMUNICATOR	£49
SPEECH ROM	£24
Printmaster	£24

Wordwise £24

Wordwise plus £40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £45

Inter SHEET ONLY £37



ONLY: £26

Inter-WORD £38

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM £85

INTERBASE £55

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£35
VIEW 3.0 ROM	**£48**
VIEW PROFESSIONAL	**£79**
HI-VIEW (for use with 6502 2nd Processor)	£36
VIEW Printer Driver Generator (Please specify Disc or Cassette)	£9
VIEWSHEET (Acornsoft)	£37
VIEWSTORE	£39
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc (Please specify for Master 128 or Compact)	£22
VIEW-INDEX	£12
OVERVIEW Packs 1 & 2 for the Master	£72

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

Micros in Business (Disc)

An introduction to Business software for the BBC Micro from Acorn **£43**

ADVANCE COMPUTER PRODUCTS' ROMs

Adv. Disc Toolkit	£29
Adv 1770 DFS for Mast/Compact	£29
Adv 1770 DFS for BBC/BBC+	£29
Adv Disc Investigator	£24
Adv. Control Panel	£29

MINI OFFICE II

Disc Version	£14.50
ROM Version	£47.00

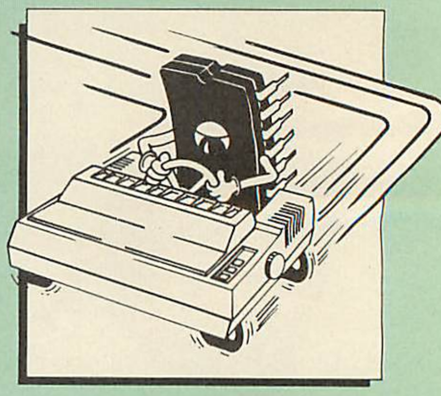
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

Acorn's Speech Synthesiser package, complete
Special Offer £18

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

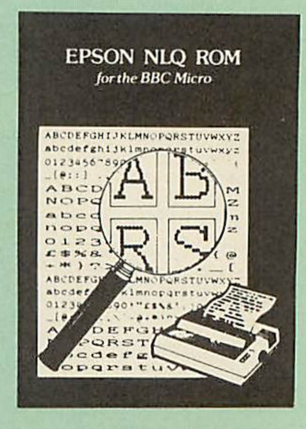
The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33



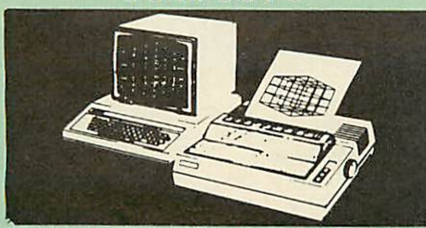
Harness the full potential of your Epson RX or FX printer. The NLQ ROM makes Epson printers produce Near Letter Quality output with optional proportional spacing, enlarged and underlined. Accessed by simple * commands from Basic, Wordwise and View (with driver) or almost any other language.

(Send an SAE for sample printout)

Only: £25

VIEW PRINTER DRIVER for NLQ ROM £7

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.

Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

The Micro User Feb. 1985.
'Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC Micro . . . it must represent excellent value for money and surely cannot be beaten".

For use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/ TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/ 400, Panasonic KX1081/82, Mannesman Tally and compatibles. **Only: £25**

BBC SOFTWARE'S
Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£11.25**
- Maths with a Story 2 (Disc) 4 further maths programs **£11.25**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£17**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£14.95**
- BONDING: Science (Disc) O Level Chemistry program. **£14.95**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£14.95**
- ELECTRONICS IN ACTION (Disc) O Level program **£19.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule: **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£6.95**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£17**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£20**
- Modem Master (Disc) **£11.25**
- ADVANCED TELETEXT SYSTEM **£9**
- PERIOD TABLE SOFTWARE **£20**
- USING YOUR COMPUTER (Cassette) 8-12 age **£24**
- Astronomy – Primary (Disc) **£11**
- Computers at Work – Primary **£16**
- Introducing Geography – Primary **£16**
- **Introducing Geography 11-17yrs** **£17**
- Electric Fields 6-14 years **£10.50**
- Statistics A level **£23**
- Bird Spy 9-12 yrs **£13**
- BlackQueen Contract Bridge **£13**
- Espana Viva – 3 Discs **£19.95**
- A Vous La France Disc **£21.50**

THE NLQ DESIGNER

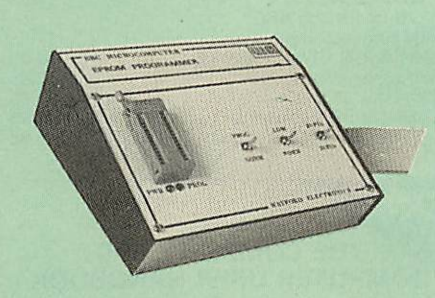
(The First & still the Best)
Supplied with over 25 Different fonts

A massively useful utility for users of the Taxan/Kaga KP810/910 or the Canon PW1080. This program allows you to define NLQ character sets to download into the printer's memory. Full on screen editing of the font. Requires 6264 RAM chip to be fitted in the printer.
Supplied with disc containing over 25 example fonts. (Please specify 40 or 80 track when ordering.) Fonts are: Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print and Gothic etc. (P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM, FONT Disc and Manual **£25**

(Write in for further details on all above ROMS)

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

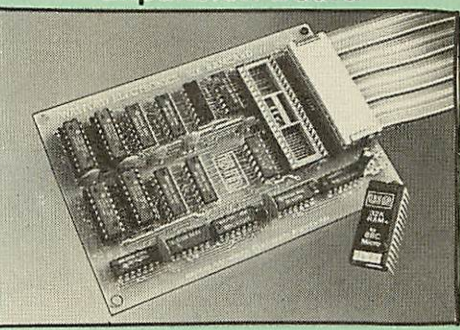
£75 (£3 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.
- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.
- Recommended by Computer Concepts for use with their Inter series of ROMs.

Only £59 (carr £2)
(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

Continued



BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£4.95
15 Hr Wordprocessing BBC/WW & WW+	£4.95
30 Hour BASIC (BBC Micro)	£9.95
40 Best machine Code Routines	£7.95
50 Programs in BBC BASIC	£6.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Lang. Subroutines	£19.95
6502 Development Package	£7.50
6502 Reference Guide	£10.95
68000 Assembly Language Prog.	£19.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£16.95
6809 Machine Code Programming	£7.95
8086/8088 Assembly Language Prog.	£11.95
8086/8088 Programming the	£16.95
Advanced Disc User Guide	£16.95
Advanced Prog. Guide to BBC	£9.95
Adv. Sideways RAM User Guide	£10.95
Advanced User Guide for BBC	£10.95
Advanced Graphics with BBC	£10.95
Assembly Language Programming on BBC Micro	£11.50
Adventure into BBC BASIC	£6.95
Amiga Hardware Ref Manual	£23.70
Applied Assembly Lang. for BBC	£9.95
ARM Assem, Lang, Programming	£12.95
Art of Microcomputer Graphics	£15.95
Assembly Lang. within BBC	£11.95
Basic ROM User Guide	£11.95
BBC B Compendium	£5.95
BBC BASIC for Beginners	£7.95
BBC Forth	£7.50
BBC Hardware Projects	£8.95
BBC Micro & Small Business	£5.75
BBC Micro & the small Business	£5.75
BBC Micro Advance Programming	£8.95
BBC Micro Basic Sound & Graphics	£7.95
BBC Micro Programming Tips	£8.95
BBC Micro ROM Book	£10.95
BBC Master 128 for High Flyer	£10.95
BBC Micro Disc Companion	£8.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£7.95
C Big Red Book of	£7.50
C for Beginners	£10.95
C for Programmers	£9.95
C Programming Lang.	£23.95
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
CP-M Bible	£16.50
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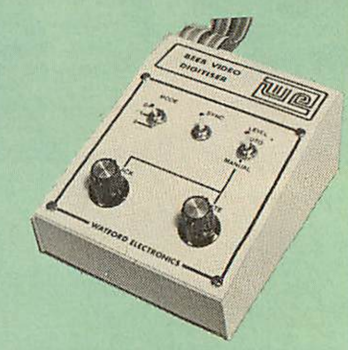
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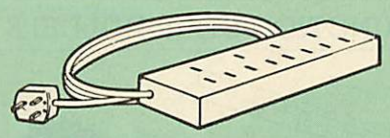
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THROUGH THE ROUND WINDOW

Most graphics software is written for the high-resolution modes, so here's a simple mode 2 graphics program designed with stained glass windows in mind

Joe Telford

One of the things which most impressed me when the BBC micro was launched in 1981, was its potential for generating colours. Most interesting was mode 2. While it produced chunky text, it was also capable of producing eight clearly defined colours plus a further eight flashing colour combinations.

The flashing colours have mainly been used for programming simple graphic effects, as well as for creating animated scenes. Screen mode 2 also suffers from quite chunky graphics, and consequently most software other than games uses modes 0, 1 or 4. A simple program which allows you to draw and colour shapes in mode 2 could be very useful. This month we look at a program to do just this.

Listing 1 in the yellow pages is called 'STAIN'. It was designed to demonstrate the colour facilities of the mode 2 screen, by drawing 'stained glass windows'. The program allows you to draw black lines on a white background, and then to fill the areas left white with various colours. So the program can be run on as many as possible of the Acorn micro range, the colour fills are written from first principles in Basic, rather than using the flood fill routines incorporated in the *GXR* ROM and the operating systems of recent machines. In this program the black lines are the lead used as the framework for stained glass windows, and the colour fills represent the glass. With the standard BBC micro, seven colours; red, green, yellow, blue, magenta, cyan and white are available. The flashing colours can also be used in a way which I will describe later.

Three programs make up the Stain suite. They will work on all filing systems,

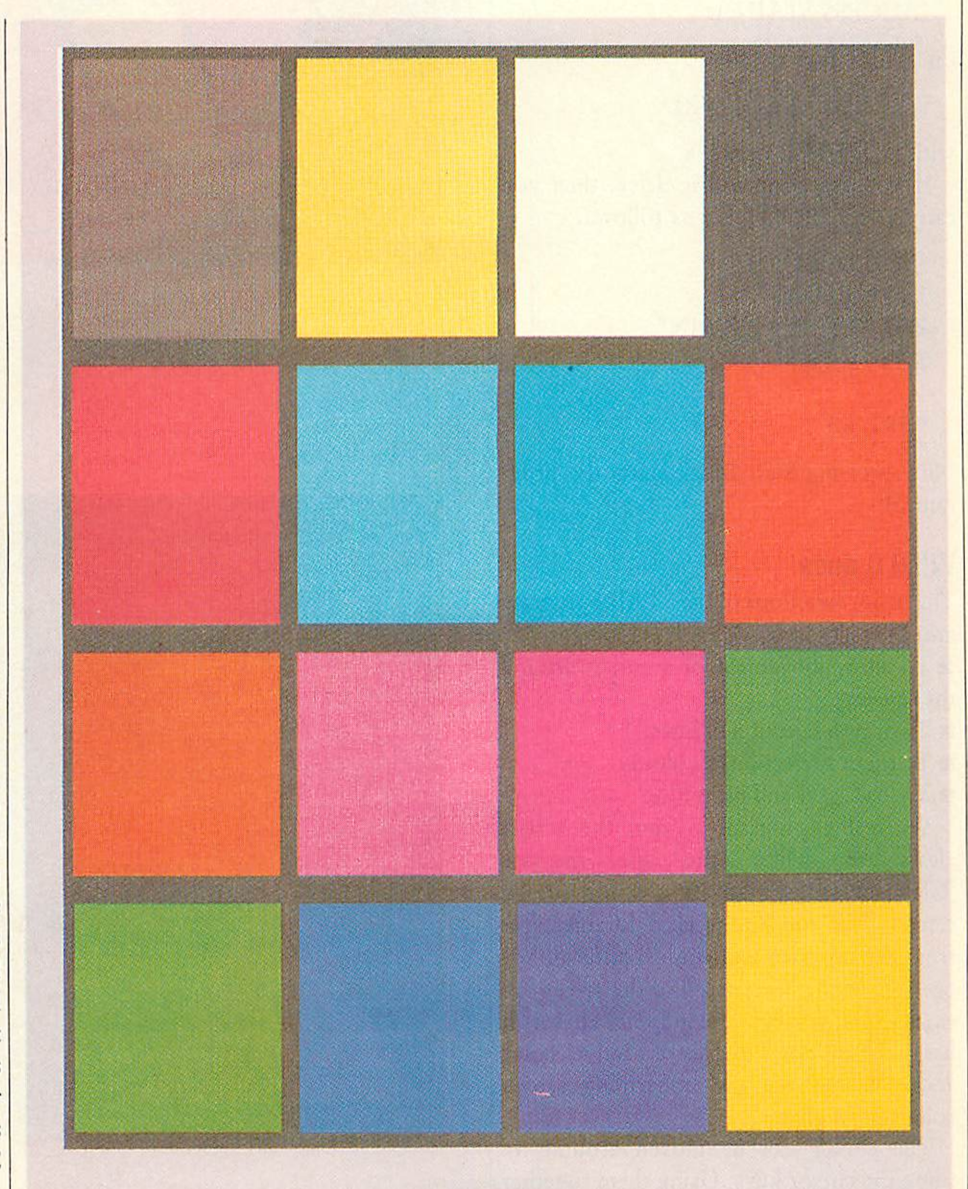


Figure 1. Sixteen of the 32 colours available from the program when you use an Integrex Colourjet printer. All are built up from three basic shades. See also figure 6

although on tape and the NFS saving and loading pictures is very slow. The Advanced Network Filing System is better. Start by typing the 'BPACK' program into your machine. Save it, then run it, and save the machine code it generates as 'PACK'. Do the same with 'BUNPACK', and save this as 'UNPACK'. If you already have the PCB design program from last November's *Acorn User*, then you could use PACK and UNPACK from that. Both PACK and UNPACK are used as star commands within the main program, 'STAIN', to handle compacted screen pictures.

Once typed into the computer, the 'STAIN' program should be saved on disc and locked before use. You do this by typing:

```
*ACCESS STAIN L
```

on a DFS disc, or

```
*ACCESS STAIN WRL
```

with ADFS or a network.

If you are using a disc drive, then you can build a !BOOT file as follows:

```
*BUILD !BOOT
0001  MODE 7
0002  CHAIN "STAIN"
0003  Escape

*OPT 4,3
```

Now pressing Shift-Break starts the program off.

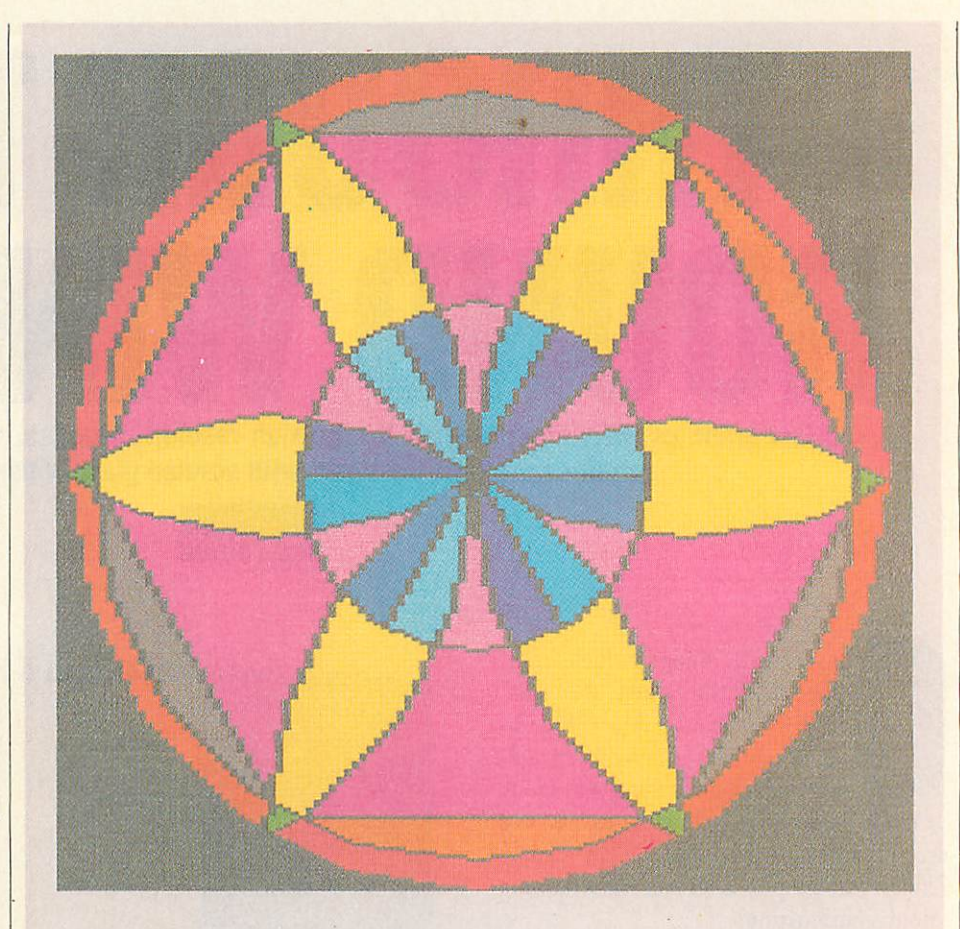
What it does

The major functions of the STAIN program are:

- To allow movement of a cursor around the screen.
- To draw a selection of lines.
- To fill in a selection of colours.
- To load, save and print files.

When the program is run, the screen clears to white and the message 'Glass=White' appears at the top of the screen. This top line is used for messages from the program and confirmation of key presses. At the bottom left of the screen is a small cross, which is the graphics cursor. It has a central dot which is its 'active' point and you can see the underlying screen colour through it.

The cursor can be moved around by using the cursor keys. Using them together with Shift doubles its speed of movement, and using the CTRL key with the cursor keys makes the cursor fly across the screen. The cursor can't leave the screen or move onto the top line, and so all your stained



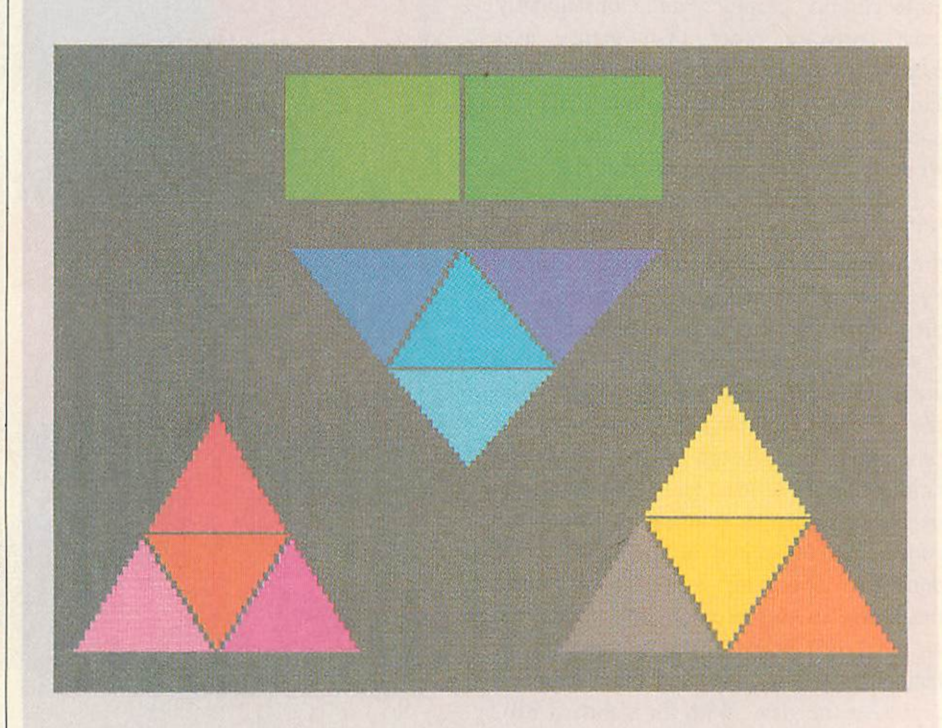


Figure 2. Examples of the drawings you can produce with the listing. Note the circle and triangle drawing routines make basic shapes easy to create

glass windows must be created in the screen area available to you for drawing.

Drawing lines

The function keys by themselves control many of the line drawing facilities. It could be worth marking these on a function key strip. Key f1 simply draws a black dot in the centre of the cursor cross. This can be used to draw very small shapes, dot by dot, or to mark points for later reference.

Function key f2 (LINE) starts and ends the drawing of lines. Move the cursor to the start of a line and press LINE. The micro tells you to move to the end of the line and press LINE again, and as the cursor keys are pressed the line which would be drawn is shown. When LINE is pressed a second time, the line is fixed. If you find you've started the line in the wrong place, press Escape before you fix the end of the line.

Circle drawing is done with function key f3. Place the cursor at the centre of the circle you wish to draw and press f3. A message tells you to move the circle's edge. As you move, the radius of the circle expands and contracts to match the cursor position. To fix the circle simply press f3 a second time. Like drawing lines, if you wish to cancel the circle before fixing it, just press Escape. To speed up the drawing, a DATA statement in the program contains the location of 20 points on the circumference of a large circle. These are repeatedly read, scaled and plotted depending on the radius set as the cursor is moved. This saves a lot of calculations involving SIN and COS, which are slow compared with ordinary arithmetic.

The key f4 which lets you draw triangles. Move to the first corner of your triangle, and press f4. Now follow the message, and move to the second point before pressing f4 again. This will draw a line. Now move to the last point and as you do so the triangle will be dragged behind your cursor. To fix the triangle press f4 a third time. To cancel the triangle before finally fixing it, press the Escape key.

Filling in the colours

The white spaces between the black 'lead' lines can be filled with colour. To select a filling colour hold down the Shift key and press a function key from f0 (black) to f7 (white). The colour will be indicated on the top display line; eg, 'Glass=Green'.

Now move the cursor to a piece of glass to be filled and press f0 – the fill command. The shape will fill up to the black lines. If the shape fails to fill completely then move the cursor to the remaining white glass and fill again. Very small patches can be filled with dots of colour with the Delete key.

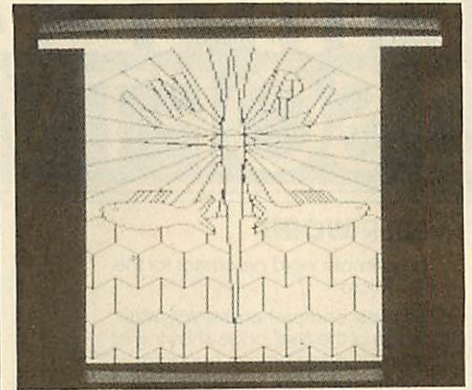


Figure 3. The outline ready to be filled

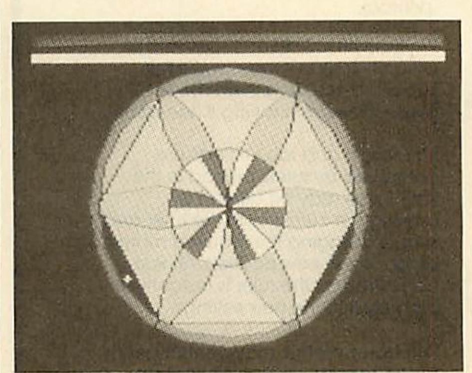


Figure 4. Working on a design on the screen

CONTROLLING COLOUR PRINTERS

How are the available colours selected by a single byte of data? This byte can be considered as a four-bit binary number. The bottom bit controls the cyan ink, bit one is magenta, bit two is yellow and bit three is unused. The ink is only printed if the bit is zero. So to print yellow, the data to send to the printer is 0011 in binary – print yellow ink but not magenta or cyan – and in decimal this is 3. Red is a mixture of yellow and magenta, so the control data is 0001, or 1.

The Integrex 132 printer uses a 32-colour palette by mixing any two of the eight basic colours using an eight-bit binary number. Brown is a mixture of red and yellow, ie, 0001 0010, or 9 in decimal. Some examples are shown in figure 6.

It is possible to re-stain previously stained glass with another colour, or to unstain the glass just by filling over the previous colour with white. It is also possible to erase black lines by carefully filling them with white. The whole screen can be completely cleared to white by pressing Shift and f8.

The CTRL key in combination with the red function keys gives a further eight colours. These are only really visible when you print out the final design on an Integrex 132 Colourjet printer. On the computer screen they appear the same colour as the Shifted function keys.

Saving drawings

Very simple filing facilities are provided which use the function keys f5, f6, f7 and f8. Function key f5 displays a catalogue of the current disc, having previously saved the compacted screen to the disc in a file called 'TEMP'. Once the catalogue is read, the space bar restores the the picture from the file. Function key f6 loads a picture to the screen from the disc, and function key f7 saves a compacted screen on to the disc. If a file doesn't exist, then an appropriate message is displayed. Also, if you are about to save a picture over another file, then a warning is given – this allows you to stop the save. Delete files with f8. In all cases answering a filing prompt with just Return causes the catalogue to be displayed, while the Escape key stops the current filing system action.

Because the pictures are stored in compacted form, they cannot be used directly by other programs. To uncompact them, you should make sure that there is enough space on your disc, then write a short program like that shown in figure 7.

Make sure that *UNPACK is saved on the disc in question. Another useful mini-program, shown in figure 8, is one to convert from the *Acorn User* 'LDPIC' format to 'PACK' format. 'LDPIC' is the program used on the *Acorn User Gallery* and *Portfolio* discs – and it was listed in October 1986. Loading using LDPIC is slower than UNPACK, but the files are more efficiently compacted. Again, make sure that *PACK and *LDPIC are both on the disc in question.

Pressing f9 allows you to leave the program after a preliminary safety check, and then returns control to Basic, tidying the memory as it goes.

A few new lines of code are all that are needed to produce a 'carousel' display of your stained glass windows. This is listed as listing 4 on the yellow pages. Make sure that *UNPACK is on the disc, together with your pictures.

Printing your drawings

Many enthusiasts are happy to look at their creations on a monitor. But a growing number of people, particularly in schools, are using colour printers to display their masterpieces. With the Epson JX80 or other Epson-compatible colour printers, you can

easily employ *Acorn User's UserDump* ROM to obtain a colour printout.

The alternative colour printer is the Canon PJ1080 colour ink jet model. This printer is available in a number of guises, from ex-demo models badged as Tandy Colourjet printers (GC220) to brand new, souped-up models sold as the Integrex 132 Colourjet. The STAIN program will drive any of this range, because they are internally very similar. It is worth remembering that the extra cash you pay out for the Integrex version gets you a true 32-colour pallette, part of which is shown in figure 2, as well as the limited eight-colour pallette available on the other versions.

At the beginning of the STAIN program, there is a line which reads 'printer$="INT2"', indicating the program is set to perform a 16-colour dump. Alter this to printer$="INT1" for a simple eight-colour dump on an Integrex, or to printer$="TANDY" for an eight-colour dump on a Canon or Tandy printer. This sets up a single-byte control code that affects the way the dump is done.

Now, when the program is running, simply tapping Shift-f9 will lead you, via a series of messages, to dumping those screens. One word of warning though – colour dumping is a slow process, and really keen users might like to convert these routines to machine code.

Picture drawing hints

Although half the fun of using a graphics package is working out how to achieve the end result you want, it is useful to keep a few points in mind as you work:

- Always have an idea of what you intend to draw. Perhaps you could sketch your picture on paper first.
- Start with easy, bold shapes and build from them.
- Save your work regularly under different titles and then delete the ones you don't want at the end. This allows you to go back to a previous file if you make a mistake.
- Use the Delete key to fill tiny areas, or to erase or separate areas of colour. The Delete key works with the current glass colour.
- Use fill in black to give you thicker lines.
- Use fill in white to erase mistakes.
- Always save before printing.
- Always make sure that there is room on your disc for your current picture. You can do this by simply loading a previous picture and re-saving it with the filename you wish to use for your new picture. Then clear the screen to white and start to draw.

Turn to page 111 for details of Joe's listings

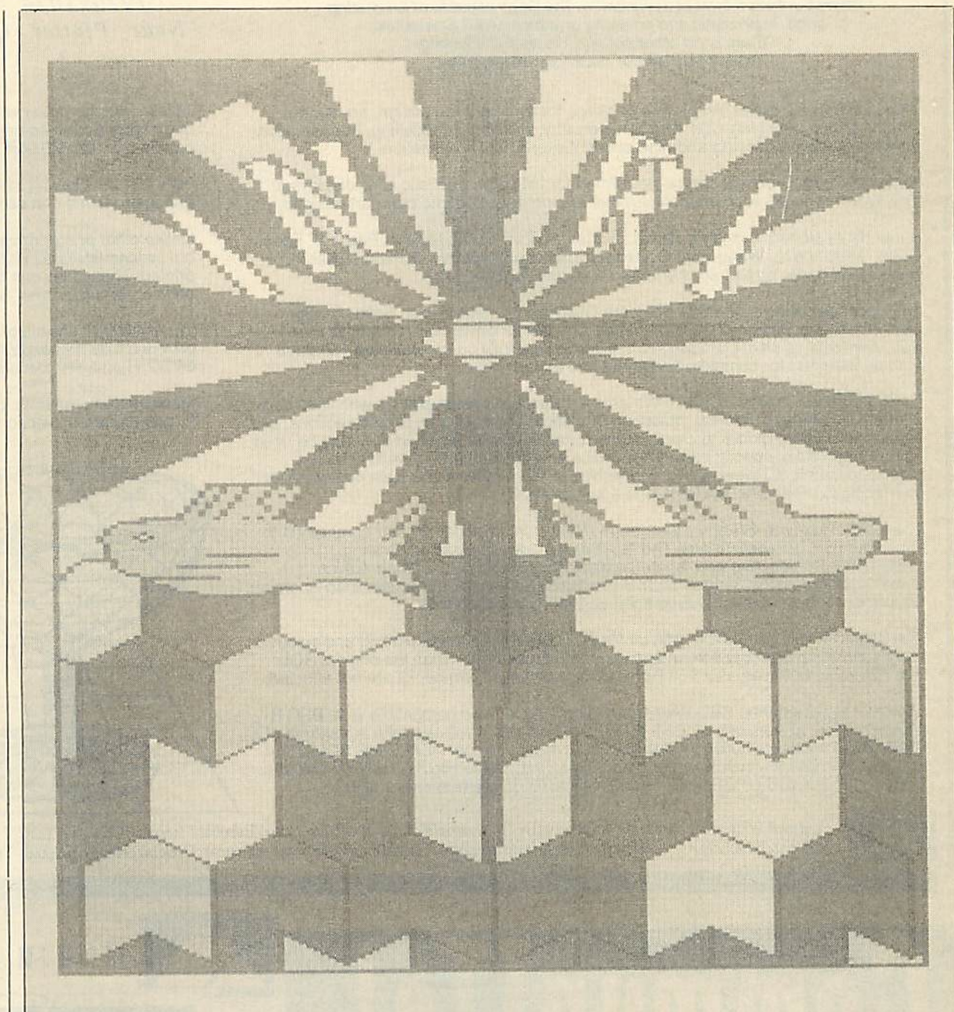


Figure 5. The colours have been added to figure 3 to give the kind of design which used to be popular inset in the doors of suburban Thirties semis

Colour	Bit 7 Spare	Bit 6 Yellow	Bit 5 Magenta	Bit 4 Cyan	Bit 3 Spare	Bit 2 Yellow	Bit 1 Magenta	Bit 0 Cyan	Denary
Black	0	0	0	0	0	0	0	0	0
Red	0	1	1	1	0	0	0	1	113
Green	0	1	1	1	0	0	1	0	114
Primrose	0	1	1	1	0	0	1	1	115
Purple	0	1	1	1	0	1	0	0	116
Magenta	0	1	1	1	0	1	0	1	117
Cyan	0	1	1	1	0	1	1	0	118
White	0	1	1	1	0	1	1	1	119
Brown	0	0	1	1	0	0	0	0	48
Bright red	0	0	0	1	0	0	0	1	17

Print: Bit=0 No print: Bit=1

Figure 6. Some of the Integrex printer codes

```
   10 INPUT"Name of compact
ed picture:   " c$
   20 INPUT"Name of uncompa
cted picture: " u$
   30 MODE 2
   40 PROCosc("UNPACK "+c$)
   50 PROCosc("SAVE "+u$+"
3000 +4000")
   60 END
   70 :
   80 DEF PROCosc($&900)
   90 X%=0:Y%=9:CALL &FFF7
  100 ENDPROC
```

Figure 7. Uncompacting routine

```
   10 INPUT"Name of LDPIC p
icture: "d$
   20 INPUT"Name of PACK pi
cture:  "p$
   30 MODE 2
   40 PROCosc("LDPIC "+d$)
   50 PROCosc("PACK "+p$)
   60 END
   70 :
   80 DEF PROCosc($&900)
   90 X%=0:Y%=9:CALL &FFF7
  100 ENDPROC
```

Figure 8. Transfer from LDPIC to PACK

REALTIME SOLIDS MODELLER

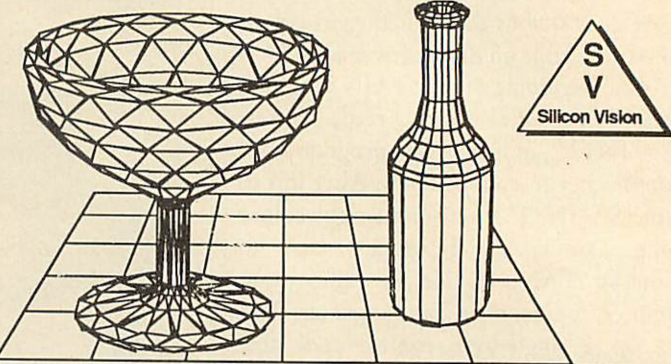
Reviews of the original REALTIME GRAPHICS SYSTEM:
"there isn't anything yet available for the Beeb capable of producing such impressive and powerful graphics"-A&B Computing.
"there is no other software to rival it"-Beebug.
"there is no better package" -Acorn User.

- The complete 3D Solids/Wireframe package for architectural design, art design, interior design, teaching CDT and 3D geometry, molecular modelling, mathematical plots, scientific processing and high speed flicker-free 3D animation.
- Hidden Surface Removal can be performed for full colour realistic solid displays at high speed. The 3D solid images can then be incorporated into other art designs.
- Supports all plotters including HP-GL, Plotmate, Penman II, Hewlett Packard, Epson HI-80, Hitachi 672, Watanabe, Graphtec, Calcomp, Seckonic, Houston DMP, Roland and paper sizes from A0 to A4 for professional results.
- The package consists of a 32k Realtime Graphics Language rom, Solids Design disc, Wireframe Design disc, Multi-plotter and printer driver disc, Demonstration disc, Applications disc, Database library disc and a fully comprehensive 150 page manual designed for complete beginners and experts alike.
- Design facilities include 3D Solid/Wireframe Editors to design objects with lines and surfaces, create symmetrical objects by Sweeping or Extruding simple sections, use objects as building blocks to create more complex objects which in turn may be used as building blocks, specify individual surface and line colours for multi-coloured objects, dynamic 3D viewing in any graphics screen mode and a Data convertor for interfacing to other CAD systems and applications.
- The Solids Realtime Graphics Language (RGL) rom provides 52 star commands to write your own 3D applications. The facilities include 3D Rotation, Scaling, Translation, Perspective and Isometric displays, Orbiting, 3D Turtlegraphics, Geometric processing, unique 35,000 pixels/sec line generator (faster than Acorn's 9000/sec) for high speed 3D animation and many more options.
- The Solids RGL is compatible with all the BBC graphics screen, plotting and colour modes including Shadow screen and is up to 5 times faster than the original RGL. The 32k RGL behaves as a 16k Rom hence sideways Ram banks are not affected.
- Minimum requirements: BBC B/keyboard/single drive. Also compatible with BBC B+, Master series, all versions of DFS & DDFS. The system will also take advantage of a 6502 2nd Processor/Turbo or AMX/QUEST Mouse. Prices: REALTIME SOLIDS MODELLER: £89.95 (inclusive); Original REALTIME GRAPHICS SYSTEM: £49.95 (inclusive); SOLIDS UPGRADE (return original RGL rom with order): £39.95

SUPER-DUMP

1920x1024 Resolution Breakthrough ! Near Plotter Quality hardcopy at a fraction of the cost.

- At last a printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide *1920x1024 resolution* as opposed to the 640x256 resolution limitation of most printer dumps.
- Fully compatible with the Realtime Solids Modeller and all other CAD packages and applications that can produce a VDU text file of a screen image.
- Unlike other printer drivers, Super-Dump does not use screen images directly but instead operates on text files of VDU codes that represent the image to be printed. These files can be created by your own graphics programs with the addition of two simple *SPOOL statements.
- The package consists of a Super-Dump disc complete with documentation and provides fully proportional dumps at resolutions of 1920x1024, 640x512 & 640x256. Images can also be scaled, positioned and previewed before printing.
- Minimum requirements: BBC B/single drive. Also compatible with BBC B+, Master series, all versions of DFS & DDFS. SUPER-DUMP: £19.95 (inclusive).





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HINTS FOR MORE TINTS

Colour prints from your dot-matrix printer? Impossible, surely! Well this is how you do it. . .

Dorian Goring

Any teacher who has introduced print making techniques to pupils will be aware of the difficulties and mess this can create. A computer in the art department can provide an exciting alternative

Traditional silk screen printing is a kind of stencilling. Loosely woven material such as silk is stretched over a frame to make a very fine ink sieve. Parts of this mesh are masked off and colour is spread thinly across the screen using a rubber squeegee. Unmasked parts of the screen allow ink to squeeze through onto the paper beneath. Several colours can be printed onto one sheet of paper by giving each colour its own mask and squeezing ink through each in turn.

This method is widely used in commercial art and advertising, and in the production of high quality fabrics and wallpapers. It is easy to understand, the image can be created and repeated quickly, and it is cheap. But the process also requires much patience, practice and experimentation to become proficient.

For artists like Andy Warhol, it encouraged experimentation and inventiveness. For the creative computer user, a variant of the silk screen process provides a cheap means of printing in colour on a standard dot-matrix printer.

Desktop publishing or graphics software such as *SuperArt* can help you create screens or masks for each colour. Each screen can printed using thin coloured carbon paper instead of the printer's ribbon. This combination can be applied to text, digitised photographs or free-hand drawings, separately or together on a page.

Each illustration in this article was built up piecemeal from three screens. Each screen was made by separating out areas from the original screen image to make three seperate images, and assigning a colour to each. I've been able to use black, blue and red – I can't get yellow carbon paper. Can anyone suggest a supplier? Finally, with the paper carefully aligned, each screen was printed with the correct colour carbon.

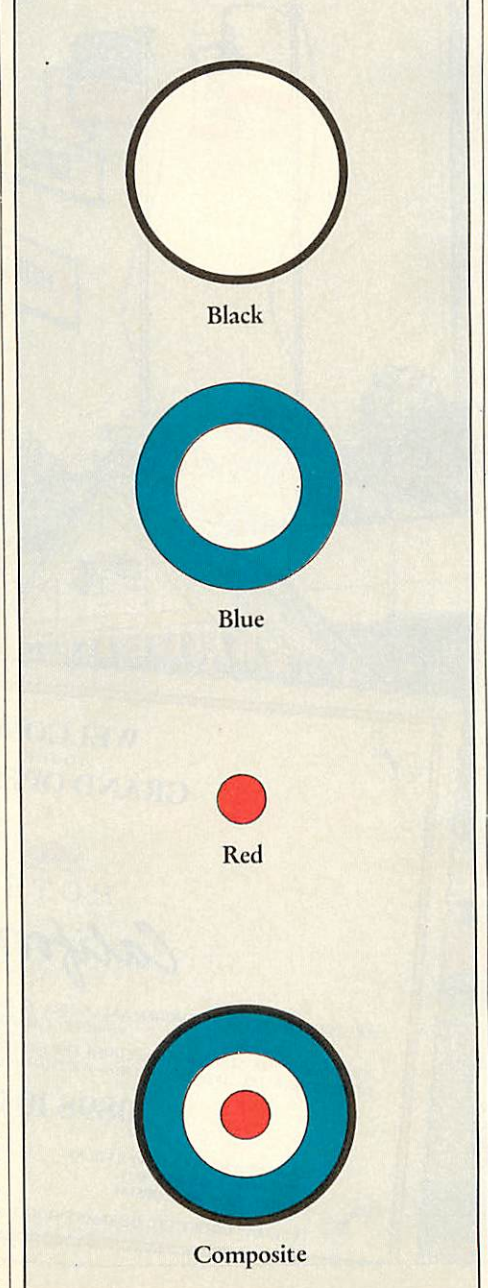


Figure 1. Building up a composite image

The essence of the technique is to draw a single image on screen using your normal software, and save it as your 'master' image. Perhaps you could start with a simple image like the red, white and blue RAF roundel (Figure 1).

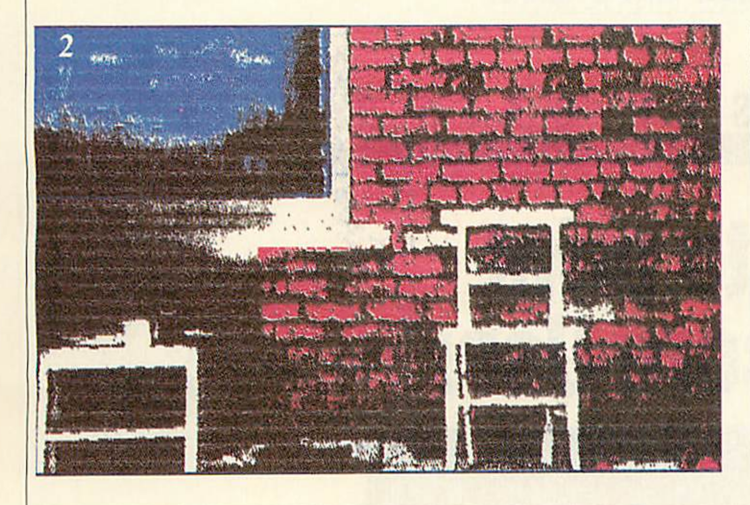
Next, make the 'red' screen by deleting those bits you don't want printed red – in this case the black outline and blue circle. Now convert the remaining red area to black so it prints solidly. Remember, what you see is what is printed. Save this part-image with the suffix 'R' for red. Reload the master image, and make the blue and black screens using the same method, deleting the areas not to be printed and converting the rest to black. Save using suffix 'B' for blue and 'Bk' for black.

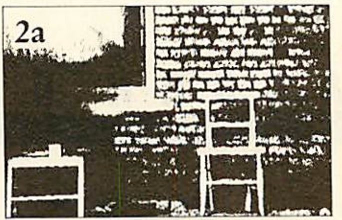
Finally, print each screen in turn using your normal screen dump, putting the correct coloured carbon between the paper and the printer ribbon for each pass. Be extra careful to align the paper and carbon accurately in the printer each time using the ruler and guide bars. For near-perfect alignment, you can pencil in a set of cross-hairs at the top of the page. It is also possible to take the printer off-line at the end of each pass of the printhead, to check printing alignment and make adjustments.

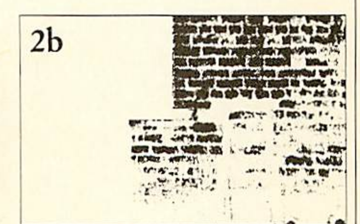
Figure 2 shows this process well. Screen a is the master – taken from a digitiser. This was printed first, using black carbon



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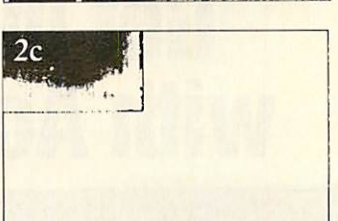
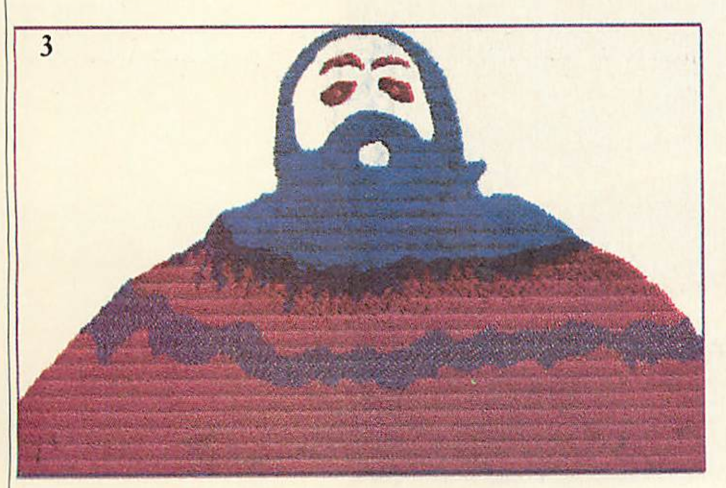
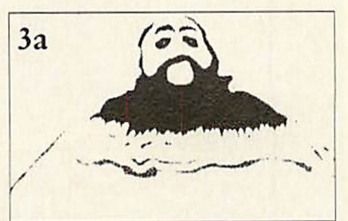
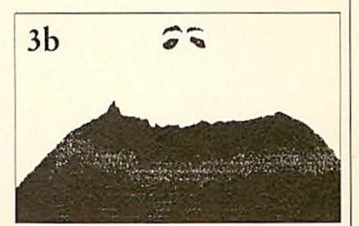


Figure 2. Screen a is the master image from a digitiser, which is printed black. The red bricks are printed from screen b, while screen c is the blue sky







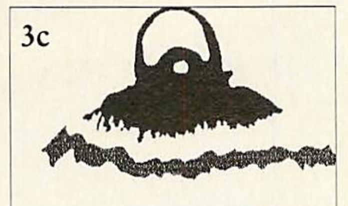
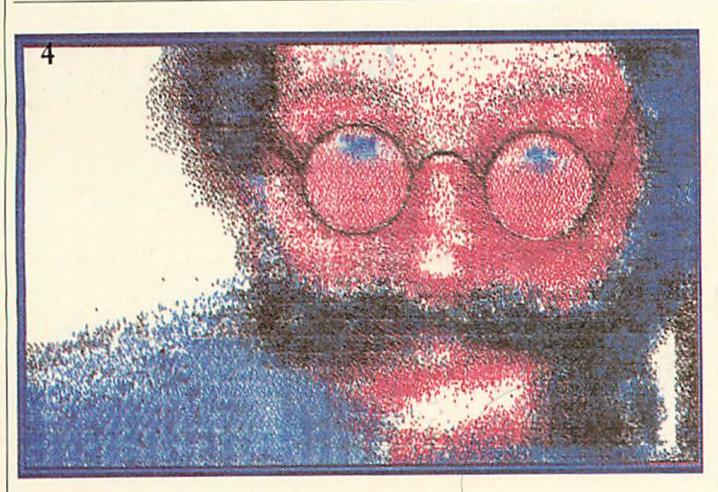
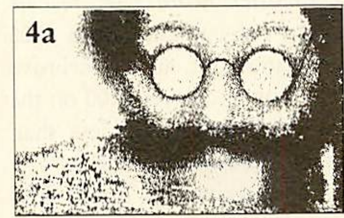
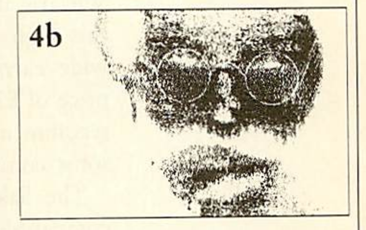


Figure 3. 'Big man' is built up from black (screen a), red (screen b) and blue (screen c). Note the stripe on the pullover created by mixing colours together







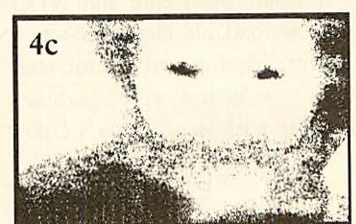


Figure 4. A digitised image is used as the master (screen a, printed black). The face is inverted for the flesh colour (screen b), and parts are deleted for the blue (screen c)

paper. Screen b is printed in red to create the brick colour. The window, table and shadow area were deleted from the original and the chair was printed black. The remaining image was inverted. Screen c is the blue, reflecting a few clouds in an otherwise perfectly blue sky. The window area was inverted and highlights added. The rest was deleted.

The procedure is slightly different with figure 3 because the original image is not printed at all. Screens a (black) and b (red) are quite similar and illustrate how colours can be mixed to create new colours. Screen 3 (the blue screen) was printed out last.

Figure 4 shows how further experimentation can lead to more complicated mixing. Some images need added texture or subtle patterning like the man's pullover (bottom left). And it's possible to print something pale blue, by using a 'grey' dotted pattern fill on the screen image instead of converting to black.

Experimenting may lead to other ideas and effects. Printing onto coloured paper brings a fourth colour – usually yellow is most needed. And you don't have to stick to carbon paper. Rubbing oil crayon colours onto tracing paper provides a crude means of introducing further colours.

Doing silk screen printing with a computer, graphics software and even a digitiser encourages exploration of compositional elements, colour and form in a more open-ended way than traditional silk screen printing might allow. Images can be rearranged, altered or manipulated on your screen easily and dumped in colour. Of course, printing a single image is much slower than with the silk-screen process, but this only really matters when you need to mass-produce the finished article.

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We are able to offer *Acorn User* readers this high quality 136-column Sakata 5500 wide carriage printer for an all inclusive price of £259, a saving of over £100 on the recommended retail price, and less than some comparable 80-column printers!

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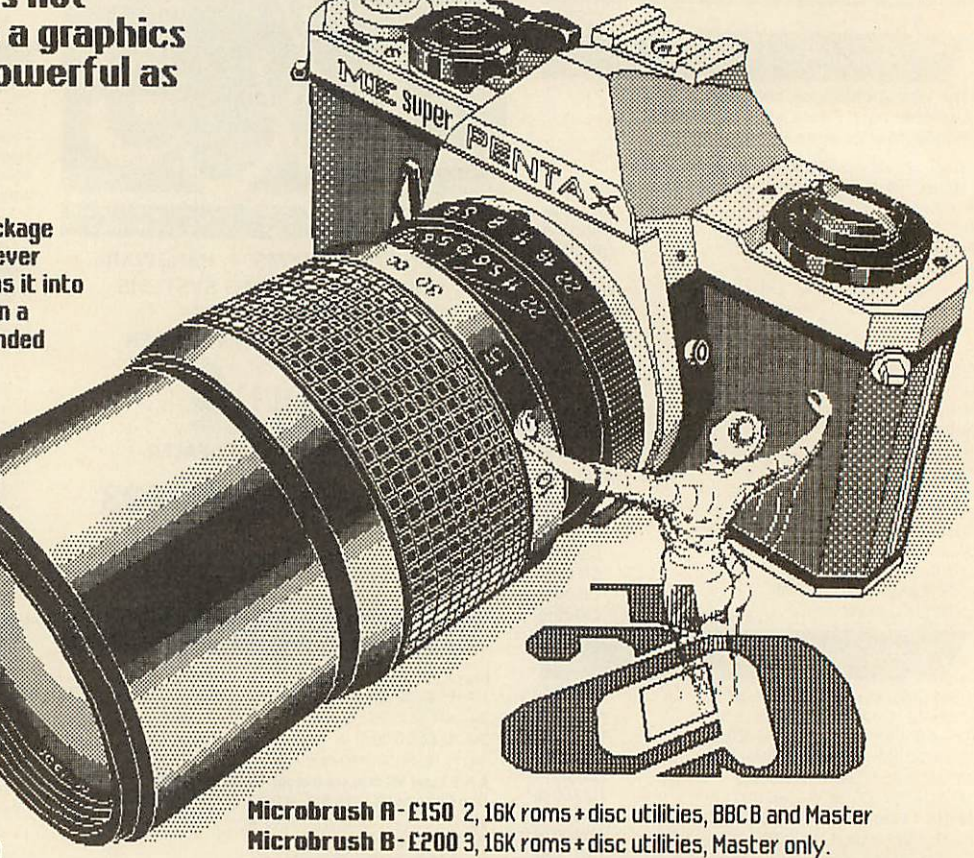
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Could you produce this advertisement on your Micro?

There is very little that is not possible when you have a graphics system as fast and as powerful as

MICROBRUSH



Microbrush is a professional graphics package for either the BBC B or the Master. Whichever machine you have, Microbrush transforms it into a powerful graphics computer. If you own a Master then Microbrush offers you extended resolution in mode 0 and mode 1.

Mode 0 - 1216*416
Mode 1 - 608*416

This whole A4 page was composed as one mode 0 high resolution image using the out-board scroll system, and has a resolution of 1216*900 pixels.

Microbrush for the BBC B is comprised of two 16K roms. The Master version contains a third rom. The first two roms can be used in either machine.

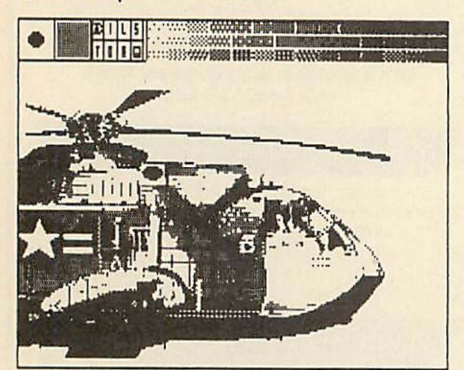
The whole system is menu driven and controlled by the Marconi RB2 tracker ball for speed and precision, but may also be used with either the AMX or the Whigmore mouse. Please note that the tracker ball is not included.

Microbrush A - £150 2, 16K roms + disc utilities, BBC B and Master
Microbrush B - £200 3, 16K roms + disc utilities, Master only.

When ordering please remember to state which system you require, whether you need 40 or 80 track discs and a telephone no. if you have one. Orders and information requests should be sent to - AB Designs, 81 Sutton Common Road, Sutton, Surrey. Phone 01 644 6643

The Colour System

This is just 1 of 33 major graphic systems contained within Microbrush and offers you 42 colours in mode 1 and 42 grey tones in mode 0. New colour palettes can be created with which you can draw lines, sketch, fill, paint in foreground, background, opaque, transparent and combined colour. Add this to a colour rubber which will selectively erase any actual colour and you have a very powerful painting system with more than **1,000,000** possible colours.



Above the painting system in mode 0.

The Ikon Generator

The ikon generator is the main workhorse of the Microbrush system as it is used for both generating and positioning any ikon up to 6*3 character blocks. This system is also used by the typesetter and for creating colour palettes, rubbers, paint-brushes and typefaces. Up to 46 ikons can be stored in memory. The scope of the ikon facility is immense as it allows you to transform the Microbrush system into a purpose built design tool that suits your needs.

The Type Setter

With the Microbrush system you will receive 50 proportionally spaced typefaces. The smallest allows you up to 170 characters to the line and if this is not enough then you can design your own typefaces.

The typesetter displays the current font as a scrollable menu allowing you to quickly produce professional typography.

The Screen Editor and the Special Effects Generator

The screen editor is a powerful drag system that allows you to store up to a quarter of the screen in memory. Once stored, images can literally be dragged across the screen, repeated, copied, saved to disc or fed to the special effects generator.

The Special Effects Generator
This is a very versatile system which will automatically outline, inline, shadow, 3^D, half-tone, etc. any image held within the screen editor's memory.

The Injector rom

The Injector rom is the second rom in the Microbrush system. This rom contains the drawing functions such as lines, rectangles, circles, ellipses, arcs, rotate, squash, stretch, zoom, halve and quarter screens, plus a whole host of other functions.

This is a very brief description of just 7 of the 33 graphics systems contained within Microbrush. All of the systems are both fast and easy to access. Microbrush also includes a 7*7 character pixel editor and an Epson FX80 screen dump.

The Master rom

The Master rom takes you into a completely different world of graphics with almost 4 times the resolution in modes 1 and 0, plus 2 on-board graphics screens, 10 rom based typefaces and a 10 point perspective system. This is linked to a 3^D generator which is soon to be released on a 4th rom for complex perspective tasks such as the camera seen above. Also available for the Master rom is an out-board scroll system which allows you to build images with a resolution greater than 1216*2000, plus there are high res. screen dumps for both Epson and Integrex printers.

Lastly flick through the pages of this magazine and see how many of the other graphic systems are capable of producing their own advertising.

Extentions to the Microbrush system include - The out-board scroll system - £40, an extended Master rom offering you 14 colours in mode 1 and 4 colours in mode 0 - £85, a typeface editor plus fifteen extra typefaces - £25, the Master rom when purchased separately - £65.

TURNING OUT THE TABLES

Producing neat tables in *View* can drive you to distraction. Here's a Basic program to make life easy

Colin Ferrington

Typing tables can be tedious, especially if you have to do a lot for a thesis or a report. Even with a wordprocessor like *View*, which gives you a good idea on the screen of what the final table will look like, tables can take quite a long time to enter. It takes even longer if there are lots of columns of different sorts of data.

It would be nice if you could type in the data for each column without having to bother about formatting, leaving it up to the wordprocessor to centre column headings, take care of numerical input, and left justify, right justify or centre the contents of each column as required.

The wordprocessor won't do that for you. Some people use a spreadsheet for entering data like this. However, there is a difficulty – with some spreadsheets, the width of columns isn't easily adjustable.

The 'TABLE' program in the yellow pages will make it easier to assemble tables which can be read into a *View* document. It produces a table from the data you enter and stores it as a *View* file. The program is for use with a disc system but needs few changes to work with tape.

A table can be considered to consist of data 'boxes' in rows and columns, like a two-dimensional array. But the 'boxes' in a table may contain data spread over more than one line.

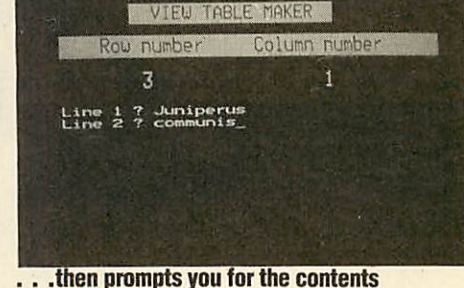
As an example, take a look at the table from a printer manual shown top right.

		column 1	column 2
row 1	line 1	FUNCTION	COMMAND
row 2	line 2	Elite pitch	ESC M
row 3	line 3	Pica pitch	ESC P
row 4	line 4 line 5	Horizontal spacing (n-1)/120 inch	ESC US(n)
row 5	line 6 line 7	Horizontal spacing (n-1)/180 inch	ESC h(n)

Tables are divided into boxes, which can be several lines long



The program sets up the file. . .



. . .then prompts you for the contents

Lines 4 and 5 of the table contain related data, and together make up the 'box' on line 4, column 1 of the table. Similarly lines 6 and 7 make up 'box' 5,1.

This sort of multi-line box has to be taken into account when calculating the number of actual rows required for the table, since multiple lines of related data in a 'box' must only count as one row. The number of lines per row is obviously determined by the box on each row that has the most lines. The maximum number of lines per row for the whole table must be known in advance since space must be reserved accordingly. The program keeps track of the number of lines typed into each box and blank lines needed as padding – for entries with less than the maximum number of lines for any row – are introduced automatically.

When run, the TABLE program first asks for a name for the table file that it will create. This is the file that can eventually be read into *View*. The filename is checked on the disc, and if it already exists, then you can either overwrite it or enter another name. Once a valid name has been entered, the number of columns of boxes, the number of rows of boxes and the maximum number of text lines in a box required for the table are entered. The number of blank lines needed between boxes is also required. Finally, the type of data to be put in each column is entered. This can be either textual or numeric. The method of justification for each column can also be set for text items – they can be centred, or aligned with either the left of right of each box. If the data is numerical, then the number of decimal places and the field width (total number of characters required including decimal point and allowing for a possible minus sign) for the longest num-

ARCHIMEDES

ROM/RAM PODULE

This podule accepts a variety of ROM or RAM chips and includes ROM and RAM filing system software.

Seven 32 pin sockets can accept any combination of ROMs (16K to 128K) or RAMs (8K to 128K)

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The controller ROM provided contains ROM and RAM filing system software, is fast, and totally Arthur compatible.

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Special controller circuitry automatically detects the type and size of chip plugged into each socket—eliminating 32 links

Edge connector plugs into podule back-plane of 300 or 400 series Archimedes

The board accepts software such as the Archimedes versions of Inter-Word, Inter-Chart and Inter-Sheet and will accept the forthcoming document processor and drawing programs. It is compatible and fully obeys all Acorn podule standards. It requires the back-plane to be installed—available from us and Acorn stockists.

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£59.00 + VAT (£67.85) with battery and controller chip



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ACCESS & BARCLAYCARD ACCEPTED

ber in the column must be selected.

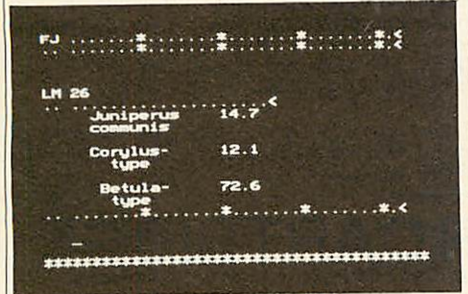
When the program offers you a default answer to the prompt, different options can be chosen using the left and right cursor keys. Make your selection by pressing Return.

Once the format for each column has been fixed, you can start typing in the data. This is carried out column by column, box by box. The program prompts you with the column number and row number, then tells you which line of the box to type in.

Simply typing Return gives a blank line. With multi-line boxes containing less than their full complement of lines of data, you can cut the process short by typing '@' on its own. This makes the program jump immediately to the next box.

Data is checked against the data type for the current column, and numerical data is converted to suit the format chosen. However, there is no reason why textual data cannot be typed into a numeric box. This is to allow you to put labels at the top of the columns of numbers.

Since the only table data to be displayed on the screen at data entry time is the data for the current 'box', the current row and



The completed file is read into *View*

column numbers are displayed to enable you to keep track of where you are in the table. The program also displays whether the current column is intended for text or numbers. You can't go back to a box you've already finished. There is no opportunity in this program to correct typing errors, since the table can be edited within *View* before printing. Once all the data has been entered, the file is saved.

To use the table in *View*, all that is necessary is to enter the wordprocessor and either LOAD the tables or READ it into another document at the appropriate point. Remember that you can read into the middle of a document by setting a marker and using the READ command.

The TABLE program automatically sets a ruler for the table, and puts the ruler in the file. So when you read in the table, it will be preceded by its own ruler. But this ruler may be inappropriate for the rest the text below the table. If you are reading the table into the middle of a document, it is best to copy the current ruler (with Shift-Copy) just below where you are about to put the table before you start.

The TABLE program also sets a left margin to centre the table in the standard mode 3 ruler, if this is possible. If the table is too wide for the standard ruler, then either it will have to be printed in a condensed mode, or with the paper turned sideways. Remember *View* files cannot be more than 132 characters wide.

The *View* file is made up mostly of plain ASCII text, with spaces used to separate the various elements of the table. The only special characters used are those to denote the ruler. Here an &81 character preceeds the two '.' characters in the left-hand margin of a *View* ruler. This is followed by the ordinary '.', '*', '>' and '<' characters that appear on the usual *View* ruler. The program could perhaps be enhanced by giving an option to emphasise particular boxes or particular rows or columns, using the *View* highlights 1 and 2. If you do this, the bytes to be stored in the table file are &1C for highlight 1, and &1D for highlight 2.

Now you can give your reports the professional look, by incorporating well laid-out tables into the text.

See page 111 for listing details

```
Speed of the RISC Chip

Acorn's ARM processor offers a huge increase of speed over
conventional eight, 16 and 32-bit machines. To take an
example, calculating the fractal graphics of the
Mandelbrot set used to be an overnight job on an eight-bit
BBC micro. The Archimedes can do the same calculations in
less than 30 seconds. The table below shows the
calculation times in seconds for several computers:
```

Computer	Language	Time
BBC model B	Basic	30600
BBC Master Turbo	Basic	10800
IBM PC	Turbo Pascal	5400
Atari ST	68000 assembler	240
32 BBCs processing in parallel on an Econet system	6502 assembler	180
MicroVax	C	150
Single Archimedes without co-processor	ARM assembler	28

```
As you can see, the advantages of RISC technology are
huge, even eclipsing modern conventional processors such
as the Atari ST's 68000.
```

Incorporating tables into text is now simple

MAIN VARIABLES

option	Work space for FNoption
name$	Table file name
drive	Destination drive for file
columns	Number of columns in table
rows	Number of rows in table
lines	Maximum lines in any row
c$	INPUT LINE string variable
co$	*View* command line character
c$()	Table array
width	Column width array
lines	Lines per row array
just	Justification mode array
field	Numeric field size array
places	Number of decimal places array
type	Column data type array

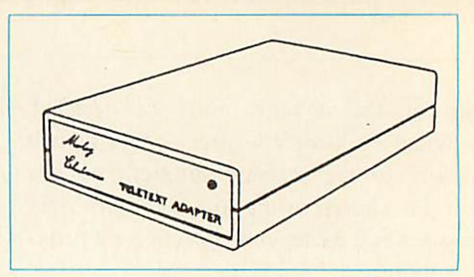
PROCEDURES

init	Program screen, constants and fixed array
name	Get valid name for table file
data	Sets up variable arrays and receives data
margins	Creates ruler and sets left margin
boxes	Sends data to file via Bput
bput	Sends data byte-by-byte to file
dwidth	Prints double width on screen

FUNCTIONS

option	Prints question and allows selection of reply
format	Checks for valid numerical data and converts to string with correct @% value.

TELETEXT ADAPTER

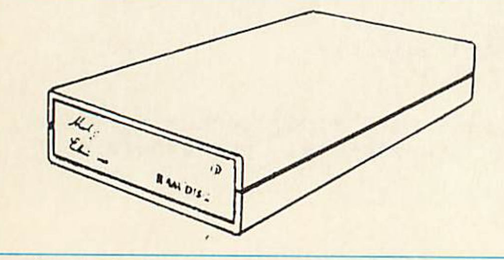


Would you like access to free high quality software and over a thousand pages of information, but Prestel access charges and phone bills too expensive? Then read on!
The answer is Teletext. Yes the same system everyone has seen incorporated into television sets, but with a difference. When Teletext is read by a computer you can actually use the data.
The MORLEY TELETEXT ADAPTER introduces you to the world of Teletext at a price that won't break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than ten years ago, will be fully compatible with any future advances in the Teletext system.
With the Morley adapter you will get a state of the art unit that automatically tunes itself into the required station (no more messing around with screwdrivers or twiddling little knobs in the back of the case), a user friendly menu driven program, easy to follow instructions and a 12 month warranty. Add to this the free downloadable telesoftware and we are sure that you will agree that we are offering you one of the best bargains on the market today.

FEATURES:
* Advanced design uses the latest technology, will handle ANY future enhancements to the Teletext system e.g.: full field; 8 bit data transfer; 2k pages etc.
* Simply plugs into the user port.
* Low power consumption, less than 200ma. Optional power supply available.
* User friendly menu driven software including extended OSCLI and OSWord commands for access from BASIC programs.
* Supplied with 16k ATS (Advanced Teletext Software) and 16k support ROM software inc. printer dumps, page spoolers etc.
* FREE Telesoftware, no access charges (updated weekly).
* Save selected pages to disc/tape for later retrieval.
* Full access to all Teletext services and channels e.g.: CEEFAX, ORACLE, 4-TEL.
* Gives you a real-time clock at your disposal (*TIME).
* Software upgrades to allow for any enhancements to the Teletext service, e.g.: extra channels, full field data on cable & satellite systems etc. (only the media charge).
* Easy to follow comprehensive user guides.
* No hardware limitations, it can for example receive virtually unlimited numbers of channels.
* Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer (no more TV or Radio Times to buy).

WHAT THE REVIEWERS SAID:
". . .In terms of price, performance, future expansion possibilities and those little touches that show thought for the end user I would recommend the Morley unit."–*(Acorn User, January, 1986).*
". . .The Morley unit has been designed to ensure that its operation is simple and smooth. It is the ideal Teletext adapter for school use."–*(A&B Computing, June, 1986).*
". . .Using it over a number of months in different schools, it has proved utterly reliable, and may confidently be recommended."–*(The Times Educational Supplement, September, 1986).*
THIS IS THE BIGGEST SELLING TELETEXT ADAPTER CURRENTLY IN PRODUCTION WORLDWIDE, AND COMES WITH A FULL MONEY BACK SATISFACTION GUARANTEE.

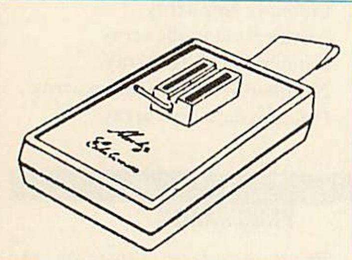
RAMDISC



Now available! The first true MEGA capacity RAMdisc for the BBC, BBC B+ and MASTER computers. This fully compatible unit, currently available in either 1 or 2 megabyte versions comes complete with operating software on ROM, power supply, and a comprehensive user guide.

FEATURES:
One megabyte of RAM connected to the 1mHz bus. Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase of speed, for example, a 20k mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc. The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any Acorn compatible DFS (not ADFS). The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive number is 4. Any 'Dangerous' *commands such as *COMPACT, *COPY, *BACKUP etc can be intercepted and the BBC's RAM from page 2 to &7FFF saved to RAMdisc workspace, and may be recovered using a *command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The filing system wedge ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter verifier and 'sector' editor for use with the RAMdisc. Catalogue structure allows up to 2,688 files.
Well that's the spec., add to this our usual 12 month no quibble guarantee and we're sure you'll agree the Morley RAMdisc is the sensible alternative if increased storage capacity and speed is your requirement.

EPROM PROGRAMMER V2



The MORLEY EPROM PROGRAMMER V2 is a small self contained unit that plugs into the BBC or MASTER user port. It comes with a high quality ZIF (zero insertion force socket) and contrasting plastic case. Also included in the package is it's own user friendly menu driven software on ROM or disc.
This state of the art unit, allows programming of 2764 (8k), 27128 (16k), and 27256 (32k) EPROMS. Not only does the hardware allow programming of the usual NMOS devices, but will handle the new generation CMOS equally as well, and with the average time taken to program a 16k at less than 30 seconds we believe it to be one of the fastest programmers available today.

THE HARDWARE
The Unit is completely under software control, there are no knobs or switches to baffle the novice, and the extended features provided should excite the pro's.

THE SOFTWARE
The comprehensive user friendly software included in the package has two main parts, the first allows EPROMS to be read, programmed, verified and edited, also allowing a ROM image to be loaded or saved to disc. The second is a full ROM management system in its own right, which has a host of useful features and routines, such as KILL and RESURRECT ROM to disable or enable a sideways ROM, dump ROM image to buffer or disc, move ROM image in buffer to sideways RAM, and VIEW-SEARCH any sideways ROM.
The whole system is available now for less than the price of one WORDWISE chip. So get yourself the all new MORLEY EPROM PROGRAMMER V2 today and start using those expansion boards for what they were made for! ROMS.
Immediate delivery no quibble 12 month guarantee.

MASTER CARTRIDGE

Designed and manufactured by Care Electronics to Acorn specifications.
These high quality Master expansion cartridges will take two 16k sideways ROM's, and will, unlike similar cartridges available from other manufacturers, accept the new second generation programs, such as Computer Concepts Interword and Spellmaster ROM's.
These Cartridges come in a high quality, robust, formed-plastic case, that fits neatly into either one of the Master's cartridge slots.
QUADS also available quad cartridges specifications as duels but taking 4x16k roms.

MASTER SMART CARTRIDGE

This device was designed and manufactured jointly by Morley and Care Electronics.
The **Smart** cartridge will at the press of a button halt any program running in memory and execute any one of a host of useful built in, or user defined procedures, and once completed will return to the program and continue where it left off. The only limiting factor with this device is the programmers imagination.
The **Smart** cartridge will prive useful to the novice, allowing him to do the simple things like dump any screen to printer, and make backups of protected tape or disc based software, but has an open ended specification for the advanced 'HACKER' allowing advanced programming techniques to be incorporated into almost any program at the touch of a button.

BUILT IN FEATURES (at the press of a button)
Autosaves computer's entire memory.
Freeze program at any point.
Screen dump (any mode) to printer or disc.
Allows any OSCLI command without disturbing memory.
Copies 90% of protected software.
Tape to disc, disc to tape.
User friendly menu.
Sound On/Off.

ALL CARTRIDGES COME WITH A 12 MONTH NO QUIBBLE WARRANTY

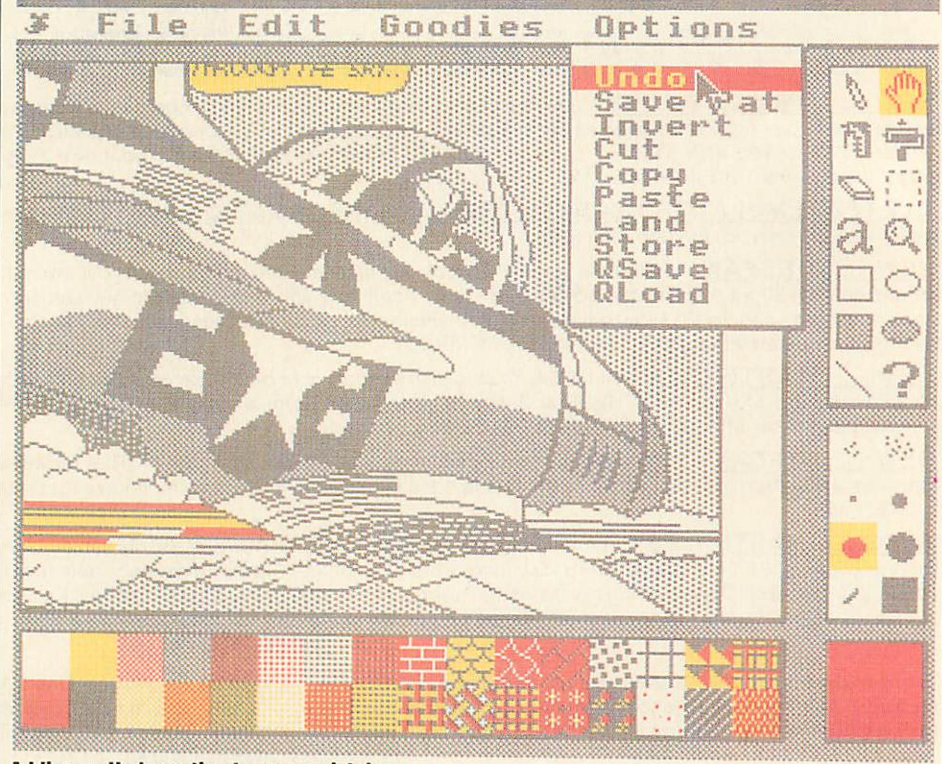
ART COMES UNDONE

You can add your own routines to *Super Art* – here are a couple of examples to get you started

Michael Isard

One of the most powerful and sophisticated drawing packages available for the BBC micro is *AMX Super Art*. However, unlike *Fleet Street Editor*, it cannot store several screens in memory. There isn't enough room in main memory for two mode 1 screens, even with the reduced-size drawing window used by *Super Art*. The screen loading and saving routines are also extremely slow compared with the speed of a direct *LOAD command. If you have one or two sideways RAM banks on your micro, the program listed on the yellow pages gives you screen storage and 'undo' features with *Super Art*, as well as fast saving and loading routines.

Super Art contains several menu options which are shown in a different colour and cannot be selected, for example 'Help' on the Mouse menu and 'New' on the file menu. The options menu has 'Undo' and three 'User' options which are not used. It is relatively easy to incorporate your own user routines, and you can take advantage of the four spaces on the Options menu to provide four new functions.



Adding an Undo routine to erase mistakes

How the AMXIN file works

The way that new routines can be added is by putting your own programs on disc. These routines need to be installed, using the 'Install' option obtained from the mouse on the main menu bar at the top of the screen. In fact, this doesn't load your own programs: it merely loads data about where to find your routines, and about how the routines should be selected.

Each menu option in *Super Art* has an item number, and Install loads data about which of these items are contained in your programs on disc. When disc routines are 'Installed' from the Mouse menu in *Super Art*, a file named AMXIN is loaded at &600. This file contains details of which routines should be loaded when the corresponding item is selected. Each routine is actually a program 'overlay' that is loaded into memory and run only when selected. When an overlay is loaded in, it stores its execution address at &600 and &601, and the number of the lowest page of memory it uses at &604. Location &602 is a flag which is set to 1 when AMXIN is loaded.

Overlay filenames consist of prefix – in this case 'U.user' – followed by one identifying suffix character. The prefix is stored at &645, and location &603 contains a pointer to the end of the prefix. Locations &605 to &644 correspond to 64 routines – all the menu options and icons which can be selected in *Super Art*. Each location contains the suffix identifying the overlay used by the corresponding routine. The numbers for all the standard drawing routines are shown in table 1. A zero value in place of a suffix indicates that no overlay program needs to be loaded. Most of the menu information for *Super Art* is stored in the ROM, but the 'Options' menu is held in the AMXIN file.

When AMXIN is loaded, some menu options which were previously illegal become legal. The 10 bytes from &65D

contain information about which options become legal on each of the menus. Two bytes are devoted to each menu. The low 10 bits of a given menu's pair of bytes represent that menu's options in descending order. When a bit is set to zero, the corresponding option is enabled. Since the 'Undo' program listed here used the first and bottom three items on the 'Options' menu, bits 0 to 7 of location &665 and bits 0 to 1 of location &666 must be cleared.

How the SETUP program works

The AMXIN file is put onto a *Super Art* drawing disc as you create it. But if you add new drawing functions with your own program, then this file has to be altered. The modified AMXIN file contains new data on which new menu items may now be selected.

The SETUP program, listing 1 in the yellow pages, modifies the AXMIN file. Locations &667 onwards contain the items on the 'Options' menu, all but the last followed by a Return character. The last is followed by a zero byte. The SETUP program also changes the menu data so that it will contain the names of the new commands instead of the three unselectable 'User' options.

The main program

For the main program overlay that implements the actual commands, there are separate listings on the yellow pages for machines with one or two sideways RAM banks, but the main body of the program is the same in both cases. Line 70 of listing 2 sets the number of the ROM bank containing sideways RAM – clearly this should be changed if your RAM is not in sideways bank 13. Lines 120-160 set up the vector giving the entry address for *Super Art*. On entry to a user routine, the Y register contains the number of the menu option from which it was called – the numbers are shown in table 1. This way the overlay can discover which menu item was selected. Lines 180-300 jump to the appropriate drawing routine. Exiting from the overlay with zero in the accumulator indicates that there is no routine for the option given in the Y register. Eventually exiting with A=1 indicates that a routine exists and has been executed.

The authors of *Super Art* have arranged for the 'Undo' routine to be called whenever a drawing tool is selected, as well as when 'Undo' is explicitly chosen from the 'Options' menu. The reason for all these calls to 'Undo' – which doesn't even exist in *Super Art* – is that to be able to undo an action, you have to save the state of the screen *before* the action takes place. In the version of this 'Undo' program that uses two RAM banks, listing 2 after the changes given in listing 4, one bank is used for automatically saving the screen whenever a drawing tool is selected, and the other for holding a screen of the user's choice. In the version for use with only one RAM bank, the bank can either hold a screen that the user has chosen to save (listing 2 without changes) or can be automatically updated before drawing takes place (listing 2 after change in listing 3).

When the 'Undo' routine is called by the selection of a drawing tool, the X register contains 1. This allows the overlay to differentiate between an automatic call to 'Undo' when a tool is selected and an explicit call when the 'Undo' menu option is selected.

When the 'Undo' routine is called from the menu, the appropriate sideways RAM bank is selected, and the program performs a check to see if a picture has actually been saved into the RAM. If the RAM does not contain the text 'Picture', it assumes that no picture has been saved, and 'Undo' does nothing. If the sideways RAM contains a saved screen, then the contents of the screen memory are swapped with the contents of the RAM bank. The *Super Art* window is held in memory as shown in figure 1. Zero page location &83, which contains the address of the next block of screen memory to be transferred, is initialised to &3790, and &85, which points to the next block of sideways RAM to be filled, is initialised to &8000. The memory is exchanged in blocks of &100 bytes, then both address pointers are increased by &100 and another &100 bytes transferred. The sideways RAM address is then increased by &100 again, but the screen address is increased by &180 to take account of the borders on either side of the screen window. The swapping continues in this fashion until &2E00 bytes, the size of the entire window, have been exchanged with the stored image.

The 'Store' routine works in much the same way as Undo, except the contents of screen and sideways RAM are not swapped – the screen memory overwrites the stored picture in sideways RAM. The word 'Pic-

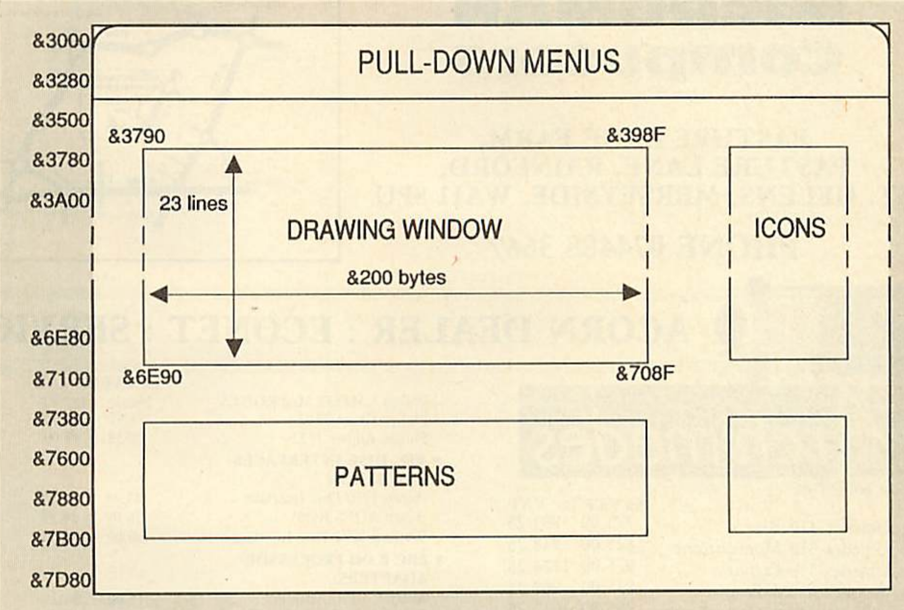


Figure 1. How the screen is stored in memory

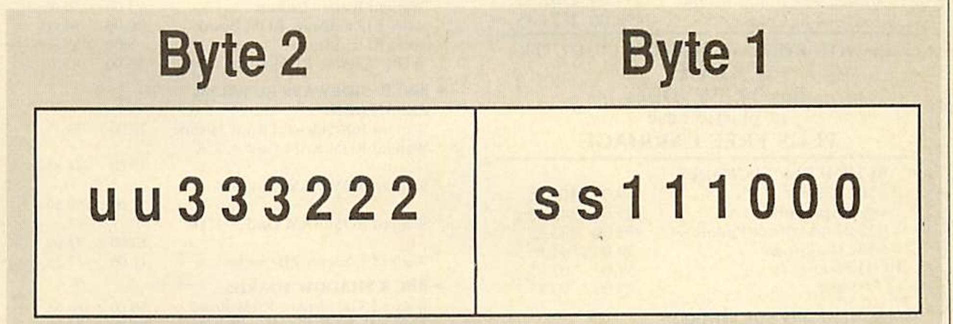


Figure 2. Packing the colours of a *Super Art* screen. 'u' and 's' are unused

ture' is then stored, to indicate that the RAM bank contains a picture.

The quicksave routine

The quick screen save routine ('QSave') is quick because it saves the whole pictures in one Osfile operation instead of the 23 Osgpbp calls usually used by *Super Art*. Osfile will not work on an open file, so if the file which will be saved is open, it must first be closed and then re-opened at the end of the routine.

Super Art keeps its screens mostly on disc. When you 'open' a picture, you are really opening the file. The file is kept open as you work on it, and only closed when you 'Close' the picture. Drawings are actually larger than the screen area visible in *Super Art*, and as you scroll across the picture, new parts of the file are loaded off the disc and old parts scrolled off the screen are restored to disc. Of course, this is slow, as each part of the picture has to be loaded and saved separately.

QSave starts by opening a screen window and requesting a filename. This is accomplished by the call to &BFF9, which is documented by AMS, as is the call to &BFE4 which accepts a keyboard input and stores it at &701. The full list of legal calls to the *Super Art* ROM is shown in table 2. If Escape is pressed, the input routine exists with the carry flag set. A parameter block in zero page starting at &14 is used by *Super Art* to store details of the last opened window, to close the window and restore the screen contents. This is done by an Osword call.

If the Escape key is not pressed, the routine closes the window and transfers the current screen to sideways RAM using the Store routine. It then selects the sideways RAM bank and copies it directly to the start of screen memory. Next, it reselects the ROM and sets up the Break vector to trap any disc error during the saving process. An Osfile parameter block is set up at &5E00, and, the size of the picture and the physical colours it uses are stored in the load and execution addresses of the parameter block according to the convention used in normal *Super Art* picture files. The size is always &20 characters wide by &17 characters high, but the colours, stored at &58 to &5B, must be packed as shown in figure 2. The routine calls Osfile to perform the save, then re-displays the screen before recovering the saved picture from sideways RAM, resetting the Break vector and exiting back to *Super Art*.

If *Super Art* has an open file correspond-

MENU ITEMS

Name	Number	Routine
USpen	1	Pencil
USmove	2	Move around page
USspra	3	Spray routine
USfill	4	Fill area
USrubb	5	Rubber
USsel	6	Select area
UStext	7	Text
USzoom	8	Zoom
USfram	9	Frame
USelli	10	Ellipse
USbox	11	Solid box
USfell	12	Filled ellipse
USline	13	Draw line
USedit	16	Edit pattern
USdump	17	User Dump called by standard PRINT routine
USpage	18	Show page routine called by ROM
USddpt	19	Double clicked on pattern
USinst	24	Install
UShelp	25	Help routine
UScat	26	Catalogue disc
USsyst	27	Do system command
USquit	28	Quit program
USnew	29	Select new picture
USload	30	Load picture
USsave	31	Save picture
USsaAS	32	Save as picture
USprin	33	Print picture – replaces whole routine
UScopy	34	Copy area
USmve	35	Move area
USusus	36	Unused
USflpX	37	Flip X
USflpY	38	Flip Y
USrot	39	Rotate area
USclea	40	Clear area
USgrid	41	Grid
USlpat	42	Load patterns
USshow	43	Show Page
USicon	44	Icons
USlbw	45	Load black and white AMX picture
USopt1	46	Undo feature
USopt2	47	Save patterns
USopt3	48	Invert area
USopt4	49	Cut area
USopt5	50	Copy area
USopt6	51	Paste area
USopt7	52	Landscape printout
USopt8	53	Store (new routine)
USopt9	54	Quicksave (new routine)
USoptA	55	Quickload (new routine)
USprt1	56	Print x1 on File menu
USprt2	57	Print x2 on File menu
USfont	58	Special text styles

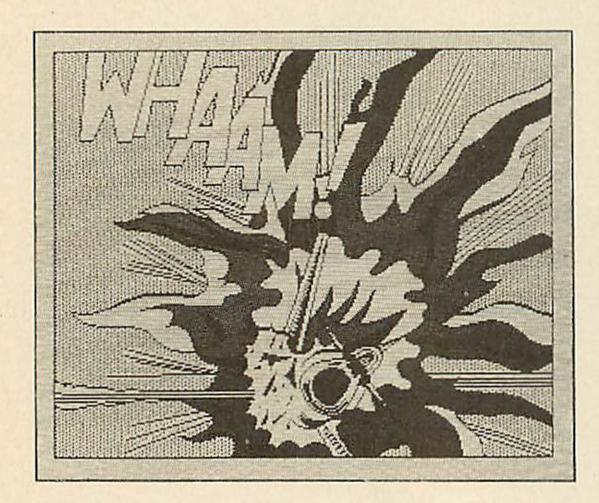
CALLS TO AMX SUPER ROM

Name	Number	Routine	Name	Number	Routine
Rmove	&BFCF	*MOVEPOINTER	Rmrec	&BFEA	Move rubber band box
Rshow	&BFD2	*SHOWPOINTER	Rspoi	&BFED	Set pointer to X, Y
Rhide	&BFD5	*HIDEPOINTER	RchkiW	&BFF0	Check inside window and do grid
RdrwPA	&BFD8	Draws all patterns			
RdispP	&BFDB	Draw current pattern	RcurOF	&BFF3	Switch cursor off
RdispT	&BFDE	Highlight current tool	Rdoscr	&BFF6	Redisplay screen and load picture
RdispS	&BFE1	Highlight current spray			
Rinnam	&BFE4	Input name	RmdlWI	&BFF9	Display middle screen with some text
Rirec	&BFE7	Initialise rubber band box			

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ing to the picture, location &53 contains its file handle. The call to &BFF6, to redisplay the screen, will attempt to load in the file whose handle is stored at &53, so &53 must be zeroed before &BFF6 is called. Even when no file is to be loaded, the routine at &BFF6 still displays 'Please Wait' in the patterns window in readiness, so another call is needed to restore the pattern display.

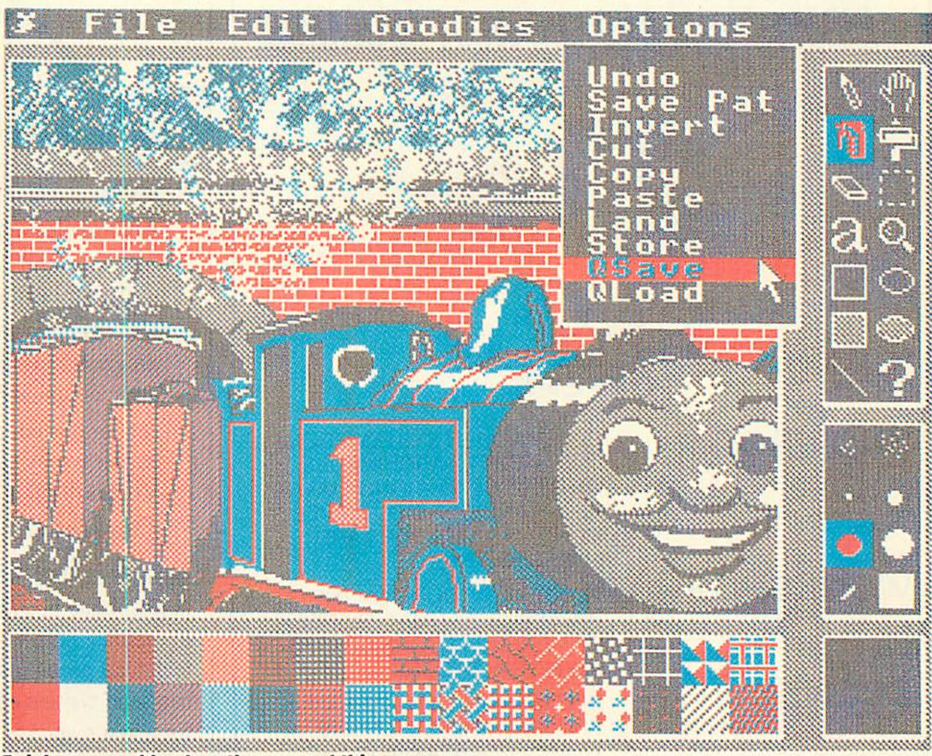
The error handling routine that traps possible disc errors has first to transfer the error message to a safe place before it restores the screen. The error message pointers are reset to the new location of the message and the Break vector is restored before jumping to the normal Break handling routine.

The QLoad routine is much the same as the QSave routine, but it's all in reverse order. An error, code &FF, is caused if the file is not present, and another error is produced if the file is the wrong size. The colours are then unpacked and set correctly on the screen, before being stored in locations &58 to &5B. The picture is loaded to &3000, the top of screen memory, and then it is transferred into sideways RAM as well. The screen is re-displayed, and then the picture is fetched back out of sideways RAM bank.

Which program for you?

The 'Undo' program can be used either with one or two banks of sideways RAM. If you have two free RAM banks on a BBC B, or if you have a Master series micro, you should make the changes shown in listing 4 after typing in listing 2. In this form of the program, when you select 'Undo' you will be met with another menu, with the options 'Tool' and 'Stored'. If you select 'Tool' the screen will be restored to its state immediately before you last selected a drawing tool – that is a real undo that undoes the last lot of drawing with the pen, rubber or whatever. In contrast, selecting 'Stored' will return a screen which you previously saved in memory using the 'Store' command on the Options menu. 'QLoad' and 'QSave' don't overwrite your stored screen – they use the 'Undo' screen.

If you have only one bank of RAM, you can use the program as shown in listing 2, which will let you use the quick loading and saving routines, and also store a picture with the 'Store' commands which can be recalled by selecting 'Undo'. If, however, you type in the changes in listing 3 as well as listing 2, the stored screen will also



Quick save and load routines speed things up

be automatically updated every time you select a new drawing tool so you can use the true 'Undo'. When using only one RAM bank, the quick screen loading and saving routines will overwrite your stored screen.

The new loading and saving routines do not affect the normal *Super Art* filing, so the File menu will be just the same as before. Normally, if you close or scroll a picture file without changing it since it was opened or last scrolled, the file will not be saved back to disc. The load routine cannot inform *Super Art* that the screen has been changed. So if you open or scroll a file, and then just quick load another screen without making any other alterations, you must make some change before trying to close or scroll the file.

The actual picture does not have to change, as long as a drawing tool is used. So you could just make some change which doesn't affect the look of the screen, like rubbing out a white area or spraying part of the picture in its own colour.

If you have just one RAM bank, listing 2 will define at the beginning the variable 'ram'. If you have two banks there will be two variables – 'ram1' and 'ram2'. It is important to make sure that these variables are set to the correct values. They should contain the number of the ROM slots which contain sideways RAM. Many 16k RAM extensions use socket &F, or others like *Acorn User*'s UserRAM or Brainsoft's 32k RAM can be plugged into any slot. The Ramamp 32k sideways RAM uses sockets &A and &D, and on a Master you should use the sideways RAM in sockets 6 and 7.

Further expansion

It is not hard to think of other extensions which could be made to the *Super Art* software; perhaps the 'Help' option on the Mouse menu or a routine to stretch areas like that in *Stop Press*. This 'Undo' program is a simple example which shows what can be done with a knowledge of the format needed to integrate routines into *Super Art*. The 'Assem' program supplied on the *Super Art* disc contains much of the information, but it doesn't explain everything very clearly.

With these Undo and quick loading and saving routines to guide you, it should be possible to devise your own new drawing tools, for example, and write them into the *Super Art* menu structure. Obviously the routines need to be written in assembly language, but you now have all the data on *Super Art* ROM calls, the screen arrangements and the AMXIN file that you need. If you do write any extensions to *Super Art*, then let us know.

Details of Michael Isard's programs are on page 111.

AMX Super Art *costs £49.99 from Advanced Memory Systems, 166-170 Wilderspool Causeway, Warrington WA4 6QA. Tel: (0925) 413501.* Super Art *was reviewed in March 1986.*

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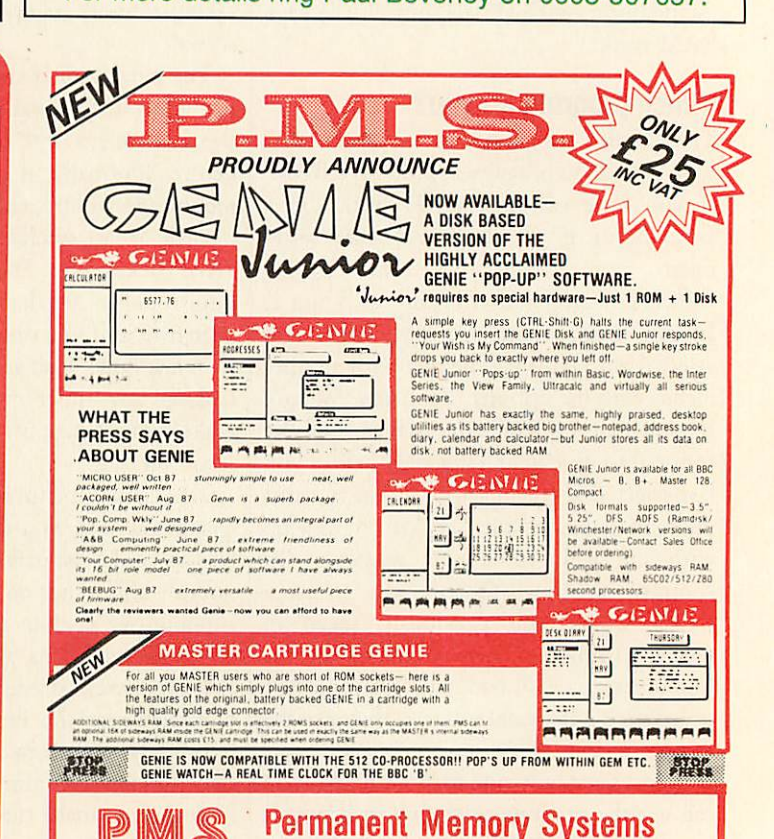
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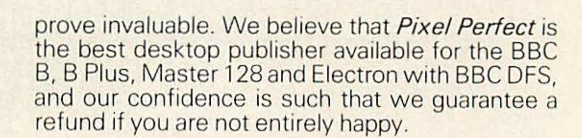
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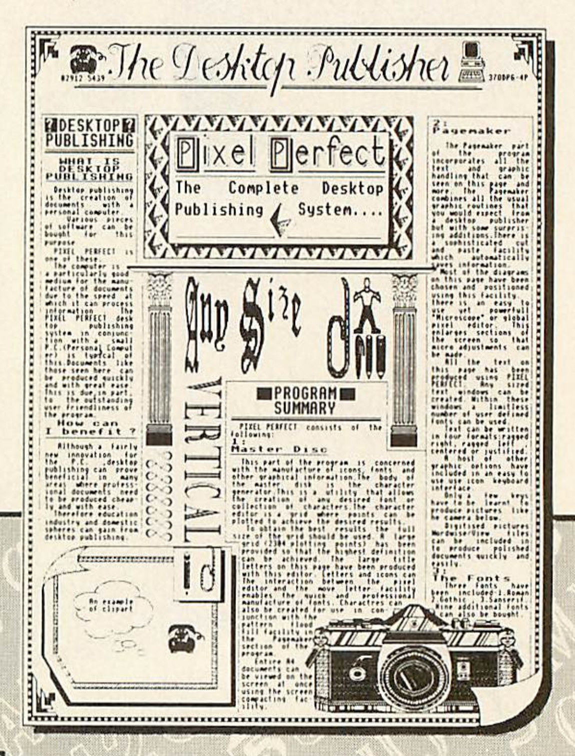
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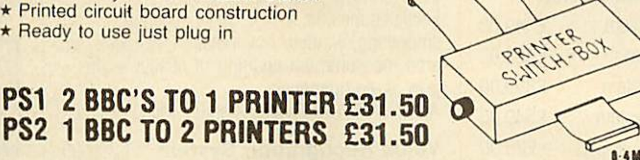
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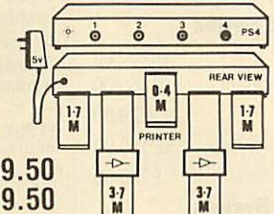
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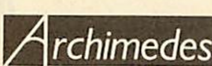
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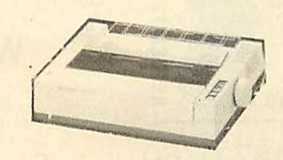




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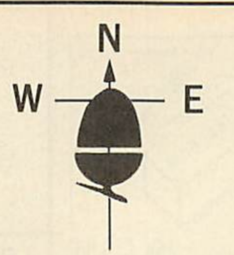
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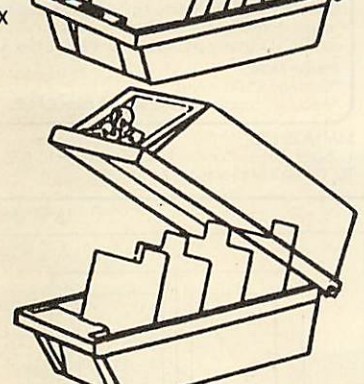
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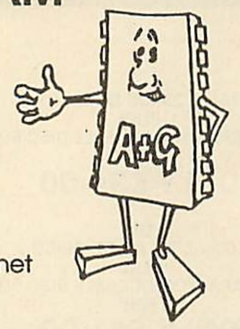


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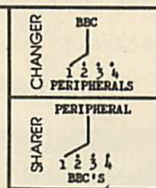
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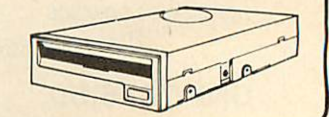
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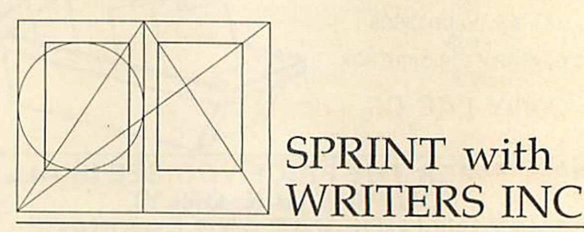
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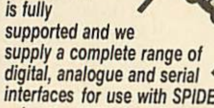
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YELLOW PAGES

INDEX/COMPATIBILITY

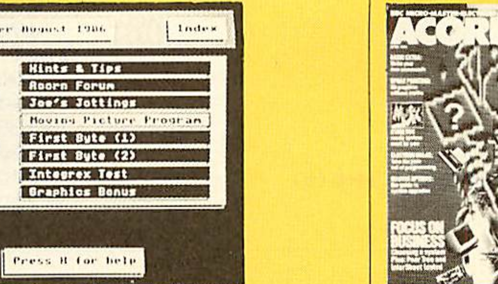
Entering listings

To make the task of entering listings easier, *Acorn User* has adopted several standards in the yellow pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the yellow pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the yellow pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1, 2 and 4 (unless stated otherwise) and with operating systems OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide an easy-to-complete 'How To Enter' box.

Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. If you still have difficulties, you can also send off for a list of *Checksums* which help you find the errors. Send a large sae (26p stamp) to *AU*Checksums, PO Box 641, London NW9 8TF.

DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 129 for details of how to order.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	112											
Listing 1		■	■	■	■	■		■	■	■	■	■
Listing 2		■	■	■	■			■	■	■	■	■
Listing 3		■	■	■	■			■	■	■	■	■
Acorn Forum	113											
Listing 1[1]		■							■			■
Listings 2a,2b		■	■	■	■	■		■	■	■	■	■
Listing 3							■		■	■		■
Joe's Jottings	116											
Listings 1-3[2]		■	■	■				■	■	■	■	■
Turning Out the tables Listing 1	120	■	■	■	■	■		■			■	■
Art Comes Undone	122											
Listings 1-4		■[3]		■				■			■	■
Top of the List	125											
Listings 1,2		■	■	■	■	■			■	■	■	■

Notes: [1] Requires Basic 2 [2] Requires Basic 2 & shadow RAM [3] Requires *AMX Super Art* and sideways RAM

YELLOW PAGES

HINTS & TIPS

See Hints & Tips, page 39

Listing 1. *View* label printer

```
10 REM Hints & Tips listing 1
20 REM by Martin Phillips
30 REM for BBC B/B+/M/C/E
40 REM (c) Acorn User April 1988
50 :
60 MODE 7
70 PROCinitialise
80 PROCload
90 PROCmanipulate
100 PROCprint
110 END
120 :
130 DEF PROCinitialise
140 size%=100
150 line%=3
160 width%=26
170 height%=10
180 startline%=0
190 endline%=5
200 indent%=4
210 DIM text$(size%),add$(size%,endlin
e%)
220 ENDPROC
230 :
240 DEF PROCload
250 PRINT TAB(11,1)"View Label Printer
"
260 INPUT ''"Enter filename: "fname$
270 F%=OPENIN(fname$)
280 IF F%>0 THEN GOTO 320
290 CLOSE# F%
300 PRINT '"No file found"'
310 GOTO 260
320 N%=-1
330 REPEAT
340 N%=N%+1
350 text$(N%)=""
360 REPEAT
370 t=BGET# F%
380 text$(N%)=text$(N%)+CHR$(t)
390 UNTIL t=13
400 IF ASC(LEFT$(text$(N%),1))<>&80 TH
EN N%=N%-1
410 UNTIL EOF# F%
420 CLOSE# F%
430 ENDPROC
440 :
450 DEF PROCmanipulate
460 FOR I%=0 TO N%
470 text$(I%)=MID$(text$(I%),4)
480 P%=0
490 oldpos=0
500 REPEAT
510 pos=INSTR(text$(I%),",",oldpos+1)
520 add$(I%,P%)=MID$(text$(I%),oldpos+
1,pos-oldpos)
530 add$(I%,P%)=LEFT$(add$(I%,P%),LEN(
add$(I%,P%))-1)
540 P%=P%+1
550 oldpos=pos
560 UNTIL pos=0 OR P%=endline%
570 NEXT I%
580 ENDPROC
590 :
600 DEF PROCprint
610 *FX 3,10
620 FOR I%=0 TO N%
630 FOR J%=startline% TO endline%-1
640 FOR T%=1 TO line%
650 PRINT SPC(indent%)add$(I%+T%-1,J%)
;TAB(T%*width%);
660 NEXT T%
670 PRINT
680 NEXT J%
690 FOR n=1 TO height%+startline%-endl
ine%
700 PRINT
710 NEXT n
720 I%=I%+line%-1
730 NEXT I%
740 *FX 3
750 ENDPROC
```

Listing 2. Double 'e'

```
10 REM Hints & Tips L
isting 2
20 REM By Martin Phil
lips
30 REM for BBC B/B+/M
/C/E
40 REM (c) Acorn User
 April 1988
50 :
60 PROCinitialise
70 PROCassemble
80 *FX 14,2
90 END
100 :
110 DEF PROCinitialise
120 code%=&900
130 osword =&FFF1
140 param=&90
150 pitch=&98
160 count=&9F
170 count!0=0
180 param!0=&FFF10001
190 param!4=&000A0000
200 pitch!0=&28586860
210 pitch!4=&4444
220 ?&220=code% AND 25
5
230 ?&221=code% DIV 25
6
240 ENDPROC
250 :
260 DEF PROCassemble
270 FOR pass=0 TO 2 ST
EP 2
280 P%=code%
290 [
300 OPT pass
310 PHP
320 PHA
330 TXA
340 PHA
350 TYA
360 PHA
370 CPY #101
380 BNE exit
390 :
400 .fool
410 LDX count
```

Continued▶

◀ Hints & Tips listing 2 continued

```
420 INX
430 STX count
440 CPX #5
450 BNE exit
460 LDA #0
470 STA count
```

Listing 3. Tune

```
10 REM Hints & Tips L
isting 3
20 REM By Martin Phil
lips
30 REM for BBC B/B+/M
/C/E
40 REM (c) Acorn User
 April 1988
50 :
60 PROCinitialise
70 PROCassemble
80 *FX 14,2
```

Continued ▶

◄ Hints & Tips listing 3 continued

```
   90 END
  100 :
  110 DEF PROCinitialise
  120 osbyte=&FFF4
  130 code%=&900
  140 ?&220=code% AND 25
5
  150 ?&221=code% DIV 25
6
  160 ENDPROC
  170 :
  180 DEF PROCassemble
  190 FOR pass=0 TO 2 ST
EP 2
  200 P%=code%
  210 [
  220 OPT pass
  230 PHP
  240 PHA
  250 TXA
  260 PHA
  270 TYA
  280 PHA
  290 CPY #101
  300 BNE exit
  310 :
  320 .fool
  330 LDX #0
  340 LDA #138
  350 JSR osbyte
  360 :
  370 .exit
  380 PLA
  390 TAY
  400 PLA
  410 TAX
  420 PLA
  430 PLP
  440 RTS
  450 ]
  460 NEXT pass
  470 ENDPROC
  480 LDY #&FF
  490 :
  500 .loop
  510 INY
  520 CPY #6
  530 BEQ exit
  540 LDA pitch,Y
  550 STA param+4
  560 TYA
  570 PHA
  580 LDX #param
  590 LDY #0
  600 LDA #7
  610 JSR osword
  620 PLA
  630 TAY
  640 JMP loop
  650 :
  660 .exit
  670 PLA
  680 TAY
  690 PLA
  700 TAX
  710 PLA
  720 PLP
  730 RTS
  740 ]
  750 NEXT pass
  760 PROCcheck
  770 ENDPROC
  780 :
  790 DEF PROCcheck
  800 N%=0
  810 FOR I%=&900 TO &93
9
  820 N%=N%+?I%
  830 NEXT I%
  840 IF N%<>&1BB2 THEN
PRINT "Checksum error":E
ND
  850 ENDPROC
```

See Acorn Forum, page 49

Listing 1. Extended Copy key

```
   10 REM Copy Plus
   20 REM by Andrew Pisk
ozub
   30 REM for BBC B with
 Basic 2
   40 REM (c) Acorn User
 April 1988
   50 :
   60 MODE 7
   70 INPUT "Assemble at
 : &" P$
   80 fst%=EVAL("&"+P$)
   90 snd%=fst%+71
  100 thr%=snd%+158
  110 frth%=thr%+74
  120 buffer=frth%+116
  130 FOR A%=&DEC5 TO &D
F0B
  140 ?(fst%+A%-&DEC5)=?
A%
  150 NEXT
  160 P%=&ED-&C5+fst%
  170 [OPT 3
  180 JSR snd%+&77-&15
  190 ]
  200 FOR A%=&E515 TO &E
5B2
  210 ?(snd%+A%-&E515)=?
A%
  220 NEXT
  230 P%=&51-&15+snd%
  240 [OPT 3
  250 JMP frth%
  260 ]
  270 FOR pass%=0 TO 3 S
TEP 3
  280 P%=thr%
  290 [OPT pass%
  300 BIT tempbuffer
  310 BPL L1
  320 JMP fst%
  330 .tx EQUB 0
  340 .t1 EQUB 0
  350 .L1 STX tx
  360 LDX index
  370 LDA buffer,X
  380 INX
  390 BEQ L2
  400 CPX indexend
  410 BEQ L2
  420 STX index
  430 LDX tx
  440 STA &E6
  450 RTS
  460 .L2
  470 DEC tempbuffer
  480 LDX tx
  490 STA &E6
  500 CLC
  510 RTS
  520 .tempbuffer EQUB 2
55
  530 .index EQUB 0
  540 .indexend EQUB 0
  550 .go LDA #thr% MOD
256
  560 STA &210
  570 LDA #thr% DIV 256
  580 STA &211
  590 LDA #219
  600 LDX #192
  610 LDY #0
  620 JSR &FFF4
  630 BRK
  640 EQUB 0
  650 EQUS "OK"
  660 EQUB 0
  670 ]
  680 NEXT
  690 FOR A%=0 TO 3 STEP
 3
  700 P%=frth%
  710 [OPT A%
  720 CMP #192
  730 BEQ WW1
  740 TAY
  750 BPL W2
  760 JMP &E554
  770 .W222 INC t1
  780 .W2 JMP &E592
  790 .FX JSR &E86F
  800 LDA temp
  810 CLC
  820 RTS
  830 .WW1 BIT t1
  840 BPL WW2
  850 SEC
  860 RTS
  870 .WW2 DEC t1
  880 STX tx
  890 .W1 JSR &FFE0
  900 CMP #27
  910 BEQ W222
  920 CMP #32
  930 BCC W1
  940 CMP #127
  950 BEQ W1
  960 INC t1
  970 .Y1 STA temp
  980 LDA #0
  990 STA index
 1000 .W4 JSR &D905
 1010 BEQ FX
 1020 LDX index
 1030 CPX #255
 1040 BEQ finish
 1050 STA buffer,X
```

Continued ►

◄ Acorn Forum listing 1 continued

```
1060 INC index
1070 CMP temp
1080 BEQ finish
1090 JMP W4
1100 .finish
1110 LDX index
1120 STX indexend
1130 LDA #0
1140 STA tempbuffer
1150 STA index
1160 LDX tx
1170 JSR L1
1180 CLC
1190 PLA
1200 PLA
1210 JMP &DF05
1220 .temp EQUB 0
1230 ]
1240 NEXT
1250 *FX 219,192,0
1260 ?&210=thr% MOD 256
1270 ?&211=thr% DIV 256
1280 PRINT "*SAVE CPY "
+STR$~fst%+" "+STR$~(buf
fer+256)+" "+STR$~go+" "
+STR$~fst%
1290 PRINT "Code now ac
tive"
```

Listing 2. Macro assembler

```
10 REM Macro Assemble
r Source
20 REM by D. J. Holde
n
30 REM for B/B+/E/M/C.
40 REM (c) Acorn User
April 1988
50 :
60 oswrch=&FFEE
70 osbyte=&FFF4
80 osword=&FFF1
90 oscli=&FFF7
100 basvar=&480
110 files=&C00
120 bgetv=&216
130 eventv=&220
140 M%=&900
150 :
160 FOR pass=0 TO 3 ST
EP 3
170 P%=M%
180 [OPT pass
190 STY scrn
200 LDA #255
210 STA flag
220 LDY #0
230 STA (&70),Y
240 DEY
250 .loop1
260 DEX
270 BEQ found
280 .loop2
290 INY
300 LDA files,Y
310 CMP #ASC","
320 BEQ loop1
330 CMP #13
340 BNE loop2
350 LDX #8
```

Continued ►

◄ Acorn Forum listing 2 continued

```
360 JSR inkbd
370 RTS
380 .found
390 INY
400 LDA files,Y
410 CMP #ASC","
420 BNE P%+4
430 LDA #13
440 STA exec+2,X
450 INX
460 CMP #13
470 BNE found
480 LDX #&79
490 .loop3
500 LDA basvar,X
510 STA varstore,X
520 DEX
530 BPL loop3
540 LDX #5
550 .loop4
560 LDA 0,X
570 STA pointers,X
580 DEX
590 BPL loop4
600 LDA bgetv+1
610 CMP #newbget DIV 2
56
620 BEQ vecdone
630 STA exitvec+2
640 LDA bgetv
650 STA exitvec+1
660 .vecdone
670 LDA #newbget DIV 2
56
680 STA bgetv+1
690 LDA #newbget MOD 2
56
700 STA bgetv
710 LDA #event DIV 256
720 STA eventv+1
730 LDA #event MOD 256
740 STA eventv
750 LDX scrn
760 LDA #3
770 JSR osbyte
780 LDX #0
790 JSR inkbd
800 LDX #5
810 LDA #14
820 JSR osbyte
830 JMP short
840 .event
850 PHP
860 CMP #5
870 BEQ P%+4
880 PLP
890 RTS
900 PHA
910 TXA
920 PHA
930 TYA
940 PHA
950 LDA flag
960 BMI first
970 BEQ second
980 LDX #&79
990 .loop5
1000 LDA varstore,X
1010 STA basvar,X
1020 DEX
1030 BPL loop5
1040 LDX #5
1050 .loop6
1060 LDA pointers,X
1070 STA 0,X
1080 DEX
1090 BPL loop6
1100 LDX #5
1110 LDA #14
1120 JSR osbyte
1130 LDX #19
1140 JSR inkbd
1150 .out
1160 PLA
1170 TAY
1180 PLA
1190 TAX
1200 PLA
1210 PLP
1220 RTS
1230 .first
1240 LDA &70
1250 STA &12
1260 LDA &71
1270 STA &13
1280 LDX #13
1290 JSR inkbd
1300 STA flag
1310 LDX #exec MOD 256
1320 LDY #exec DIV 256
1330 JSR oscli
1340 JMP out
1350 .second
1360 LDA exitvec+1
1370 STA bgetv
1380 LDA exitvec+2
1390 STA bgetv+1
1400 LDA #125
1410 STA flag
1420 JSR osbyte
1430 JSR short
1440 JMP out
1450 .newbget
1460 PHP
1470 PHA
1480 TXA
1490 PHA
1500 TYA
1510 PHA
1520 LDX #ltime MOD 256
1530 LDY #ltime DIV 256
1540 LDA #4
1550 JSR osword
1560 PLA
1570 TAY
1580 PLA
1590 TAX
1600 PLA
1610 PLP
1620 .exitvec
1630 JMP &FFFF
1640 .short
1650 LDX #stime MOD 256
1660 LDY #stime DIV 256
1670 LDA #4
1680 JMP osword
1690 .stime
1700 OPT FNequb(&F0)
1710 OPT FNequd(&FFFFFF
FF)
1720 .ltime
1730 OPT FNequb(&D0)
1740 OPT FNequd(&FFFFFF
FF)
```

Continued ►

◀ Acorn Forum listing 2 continued

```
1750 .inkbd
1760 STX temp
1770 .loop7
1780 INC temp
1790 LDA text,X
1800 BNE P%+3
1810 RTS
1820 TAY
1830 LDX #0
1840 LDA #138
1850 JSR osbyte
1860 LDX temp
1870 BNE loop7
1880 .text
1890 OPT FNequs("AU.200
")
1900 OPT FNequw(&000D)
1910 OPT FNequb(&E5)
1920 OPT FNequs("80")
1930 OPT FNequw(&000D)
1940 OPT FNequs(" ]:")
1950 OPT FNequw(&0DE1)
1960 OPT FNequb(0)
1970 OPT FNequb(&E5)
1980 OPT FNequs("50")
1990 OPT FNequw(&000D)
2000 .pointers
2010 OPT FNequw(0)
2020 OPT FNequd(0)
2030 .temp
2040 OPT FNequb(0)
2050 .flag
2060 OPT FNequb(0)
2070 .scrn
2080 OPT FNequb(0)
2090 .varstore
2100 OPT FNequs(STRING$
(80,CHR$(0)))
2110 .exec
2120 OPT FNequs("E.")
2130 .end
2140 ]NEXT
2150 :
2160 N%=0
2170 FOR I%=&900 TO &AA
A
2180 N%=N%+?I%
2190 NEXT I%
2200 IF N%<>35647 THEN
PRINT "Checksum error":E
ND
2210 :
2220 A$="*SAVE MACODE "
+STR$~M%+"+"+STR$~(end-M
%)
2230 PRINT A$
2240 PRINT "Press a key
to save":IF GET
2250 PROCoscli(A$)
2260 :
2270 END
2280 :
2290 DEF FNequb(b%)
2300 ?P%=b%
2310 P%=P%+1
2320 =pass
2330 :
2340 DEF FNequw(b%)
2350 ?P%=b% MOD 256
2360 P%?1=b% DIV 256
2370 P%=P%+2
2380 =pass
2390 :
2400 DEF FNequd(b%)
2410 !P%=b%
2420 P%=P%+4
2430 =pass
2440 :
2450 DEF FNequs(b$)
2460 $P%=b$
2470 P%=P%+LEN(b$)
2480 =pass
2490 :
2500 DEF PROCoscli(stri
ng$)
2510 DIM X% &FF
2520 Y%=X% DIV 256
2530 $X%=string$
2540 CALL &FFF7
2550 ENDPROC
```

Listing 3. Macro assembler driver

```
1 REM Macro Assembler Driver
2 REM by D. J. Holden
3 REM for B/B+/E/M/C
4 REM (c) Acorn User April 1988
5 REM Do NOT renumber!
6 :
10 ?&70=(TOP-1)MOD 256:?&71=(TOP-1)DI
V 256
20 Y%=0:LOMEM=&3800:HIMEM=&5000:PASS=
4
30 $&C00="EX1,EX2,EX3,EX4"
40 X%=0:P%=&5000:O%=&5000
50 *FX3,0
60 IF X%>0 PROCass
70 X%=X%+1:CALL &900:END
80 IF (PASS AND 2)=0 PASS=PASS OR 3:Y
%=2:GOTO 40
90 END
100 DEF PROCass
110 [:OPT PASS
```

Listing 4. *Artisan* extensions

```
7010 WHEN 0:PROCLAr:reSM%+=2:CIRCLEbx%+
140,by%-128,reSM%
7020 WHEN 1:PROCLAr:reSM%-=2:CIRCLEbx%+
140,by%-128,reSM%
7030 WHEN 2:PROCLAr:CIRCLEbx%+140,by%-1
28,reSM%
7040 WHEN 3:GCOLst%,LaRES%:POINTmx%+RND
(2*reSM%)-reSM%,my%+RND(2*reSM%)-reSM%
21640 WHEN 7:C$="Airbrush now available"
```

```
MICRONET 800 (C)          6006118a     0p
          ACORN USER PROGRAMS

1 SEPTEMBER ABUSERS GAME A.U. FREE
  Another one-liner from the back page.
                                    21/8
2 CODE KEY A.U. FREE Gives your model B
  or master the Compact's CODE key 11/9
3 GRAPHIC BONUS A.U.  FREE A free
  picture from Acorn User.         15/10
4 ACORN USER JANUARY LISTINGS A.U.
  £5.00 Wizzalon the game, Computer by
  remote control! and no more returns!
5 CALLIGRAPHY A.U. £8.95 Make yourself
  heard, print your text in BIG letters
6 FEBRUARY FREEBIE A.U. FREE Another
  picture from the Acorn User gang.
7 MARCH FREEBIE A.U. FREE Get those
  rings moving!

  GOTO 8 for more   9 Telesoftware Menu
*
Online
```

March listings

The listings can be downloaded from Micronet if you have a Micronet subscription (page 600 600 890A). The Acorn User *software can be downloaded like any other Prestel program. Go to the first page by entering *600600890#. From there the operation is fully prompted. The software from Micronet is £5.00, so you can save money too. Buy the monthly listings disc or cassette to save time and avoid errors. The disc is fully menu-driven and an excellent buy at only £5.95. The cassette version for the BBC micro and Electron contains a tape to disc transfer program and costs £3.95. The programs are also available on 3.5-inch disc for the Arc, Compact and Electron at £7.95, see page 15 for details of how to order.*

JOE'S JOTTINGS

See Joe's Jottings, page 81

Listing 1. STAIN mode 2 graphics program

```
   10 REM STAIN
   20 REM by Joe Telford
   30 REM for B/B+/M/C/E with Shadow RAM
 & Basic 2
   40 REM (c) Acorn User April 1988
   50 :
   60 printer$="INT2"
   70 MODE 130
   80 PROCsetup
   90 ON ERROR PROCerr
  100 CLOSE# 0
  110 PROCpcursor
  120 REPEAT
  130 REPEAT
  140 PROCmove
  150 IF A%=ASC("F") PROChsf(x%,y%,fcol)
 :UNTIL 0
  160 IF A%=ASC("D") PROCdot(0):UNTIL 0
  170 IF A%=ASC("L") PROCline(1,0):UNTIL
 0
  180 IF A%=ASC("O") PROCcirc(0):UNTIL 0
  190 IF A%=ASC("T") PROCtri(0):UNTIL 0
  200 IF A%=ASC("C") PROCcat:UNTIL 0
  210 IF A%=ASC("E") PROCload:UNTIL 0
  220 IF A%=ASC("S") PROCsave:UNTIL 0
  230 IF A%=ASC("d") PROCdelete:UNTIL 0
  240 IF A%=149 PROCdump:UNTIL 0
  250 IF A%=148 PROCcls:UNTIL 0
  260 IF A%=127 PROCdot(fcol):UNTIL 0
  270 IF A%>139 AND A%<148 THEN fcol=(A%
-140):PROCmess("Glass="+fcol$(fcol))
  280 IF A%>149 AND A%<158 AND printer$=
"INT2" THEN fcol=(A%-150)+8:PROCmess("Gl
ass="+fcol$(fcol))
  290 UNTIL A%=ASC("Q")
  300 UNTIL FNsure
  310 *FX 4,0
  320 *FX 12,0
  330 *FX 226,128
  340 *FX 227,144
  350 MODE 7
  360 *BASIC
  370 END
  380 :
  390 DEF PROCcls
  400 PROCmess("CLS?(Y/N)")
  410 REPEAT Y$=CHR$(GET AND 223)
  420 UNTIL Y$="Y" OR Y$="N"
  430 IF Y$="N" PROCmess(""):ENDPROC
  440 PROCpcursor:CLS:PROCpcursor
  450 ENDPROC
  460 :
  470 DEF PROCcat
  480 VDU 7:*PACK TEMP
  490 CLS
  500 *CAT
  510 PROCmess("Press SPACE")
  520 REPEAT UNTIL GET=32
  530 CLS
  540 *UNPACK TEMP
  550 PROCmess("")
  560 ENDPROC
  570 :
  580 DEF PROCload
  590 REPEAT
  600 PROCmess("Load: ")
  610 INPUTLINE "" f$
  620 IF f$="" THEN PROCcat
  630 PROCmess("")
  640 UNTIL f$>""
  650 ch%=OPENINf$
  660 IF ch%=0 PROCnofile:ENDPROC
  670 CLOSE# ch%
  680 PROCmess("SPACE loads (or ESC)")
  690 REPEAT UNTIL GET=32
  700 PROCpcursor
  710 OSCLI("UNPACK "+f$)
  720 PROCpcursor
  730 PROCmess("")
  740 ENDPROC
  750 :
  760 DEF PROCdelete
  770 REPEAT
  780 PROCmess("Delete: ")
  790 INPUTLINE "" f$
  800 IF f$="" THEN PROCcat
  810 PROCmess("")
  820 UNTIL f$>""
  830 ch%=OPENIN f$
  840 IF ch%=0 PROCnofile:ENDPROC
  850 CLOSE# ch%
  860 PROCmess("SPACE/ESC")
  870 REPEAT UNTIL GET=32
  880 OSCLI("DELETE "+f$)
  890 PROCmess("")
  900 ENDPROC
  910 :
  920 DEF PROCnofile
  930 PROCmess("No such file")
  940 VDU 7
  950 dummy=INKEY(300)
  960 PROCmess("")
  970 ENDPROC
  980 :
  990 DEF PROCsave
 1000 REPEAT
 1010 PROCmess("Save: ")
 1020 INPUTLINE "" f$
 1030 IF f$="" THEN PROCcat
 1040 PROCmess("")
 1050 UNTIL f$>""
 1060 ch%=OPENIN f$
 1070 IF ch%<>0 THEN IF FNafile:ENDPROC
 1080 PROCmess("")
 1090 CLOSE# ch%
 1100 PROCpcursor
 1110 OSCLI("PACK "+f$)
 1120 PROCpcursor
 1130 ENDPROC
 1140 :
 1150 DEF FNafile
 1160 PROCmess("Exists - save Y/N")
 1170 REPEAT A=GET AND 223
 1180 UNTIL CHR$(A)="Y" OR CHR$(A)="N"
 1190 PROCmess("")
 1200 IF CHR$(A)="N" THEN =TRUE
 1210 =FALSE
 1220 :
 1230 DEF PROCdot(d)
 1240 PROCpcursor
 1250 GCOL 0,d
 1260 MOVE x%,y%
 1270 DRAW x%,y%
 1280 PROCpcursor
 1290 ENDPROC
 1300 :
 1310 DEF PROCline(w%,d%)
 1320 err=0
 1330 lx%=x%:ly%=y%
 1340 PROCmess("move then LINE")
 1350 PROCmove
 1360 cx%=x%:cy%=y%
 1370 GCOL 4,0
 1380 MOVE lx%,ly%
```

Continued ▶

◀ Joe's Jottings listing 1 continued

```
1390 DRAW x%,y%
1400 cx%=x%:cy%=y%
1410 REPEAT
1420 PROCmove
1430 MOVE lx%,ly%:DRAW cx%,cy%
1440 MOVE lx%,ly%:DRAW x%,y%
1450 cx%=x%:cy%=y%
1460 err=2
1470 UNTIL A%=ASC("L")
1480 PROCpcursor
1490 PROCmess("")
1500 GCOL 0,d%
1510 err=0
1520 MOVE lx%,ly%:DRAWx%,y%
1530 PROCpcursor
1540 ENDPROC
1550 :
1560 DEF PROCtri(d%)
1570 err=0
1580 lx%=x%:ly%=y%
1590 PROCmess("2nd point then TRI")
1600 PROCmove
1610 cx%=x%:cy%=y%
1620 GCOL 4,0
1630 MOVE lx%,ly%:DRAW x%,y%
1640 cx%=x%:cy%=y%
1650 REPEAT
1660 PROCmove
1670 MOVE lx%,ly%:DRAW cx%,cy%
1680 MOVE lx%,ly%:DRAW x%,y%
1690 cx%=x%:cy%=y%
1700 err=2
1710 UNTIL A%=ASC("T")
1720 p1x=lx%:p2x=x%
1730 p1y=ly%:p2y=y%
1740 PROCmess("last point then TRI")
1750 PROCmove
1760 cx%=x%:cy%=y%
1770 GCOL 4,0
1780 MOVE p1x,p1y:DRAW p2x,p2y
1790 DRAW x%,y%:DRAW p1x,p1y
1800 cx%=x%:cy%=y%
1810 err=3
1820 REPEAT
1830 PROCmove
1840 MOVE p1x,p1y:DRAW p2x,p2y
1850 DRAW cx%,cy%:DRAW p1x,p1y
1860 MOVE p1x,p1y:DRAW p2x,p2y
1870 DRAW x%,y%:DRAW p1x,p1y
1880 cx%=x%:cy%=y%
1890 UNTIL A%=ASC("T")
1900 PROCpcursor
1910 PROCmess("")
1920 GCOL 0,d%
1930 MOVE p1x,p1y:DRAW p2x,p2y
1940 DRAW x%,y%:DRAW p1x,p1y
1950 err=0
1960 PROCpcursor
1970 ENDPROC
1980 :
1990 DEF PROCcirc(d%)
2000 err=0
2010 lx%=x%:ly%=y%
2020 PROCmess("Radius then CIRC")
2030 PROCmove
2040 cx%=x%:cy%=y%
2050 GCOL 4,0
2060 PROCc2(lx%,ly%,SQR((lx%-x%)^2+(ly%
-y%)^2))
2070 cx%=x%:cy%=y%
2080 REPEAT
2090 PROCmove
2100 PROCc2(lx%,ly%,SQR((lx%-cx%)^2+(ly
%-cy%)^2))
2110 PROCc2(lx%,ly%,SQR((lx%-x%)^2+(ly%
-y%)^2))
2120 cx%=x%:cy%=y%
2130 err=4
2140 UNTIL A%=ASC("O")
2150 PROCpcursor
2160 GCOL 0,d%
2170 PROCc2(lx%,ly%,SQR((lx%-cx%)^2+(ly
%-cy%)^2))
2180 PROCpcursor
2190 ENDPROC
2200 :
2210 DEF PROCerr
2220 PROCmess("")
2230 VDU 3
2240 VDU 29,0;0;
2250 IF err=2 MOVE lx%,ly%:DRAW cx%,cy%
:err=0:PROCpcursor:IF ERR=17 THEN ENDPRO
C
2260 IF err=3 MOVE p1x,p1y:DRAW p2x,p2y
:DRAW cx%,cy%:DRAW p1x,p1y:DRAW p2x,p2y:
err=0:PROCpcursor:IF ERR=17 THEN ENDPROC
2270 IF err=4 PROCc2(lx%,ly%,SQR((lx%-c
x%)^2+(ly%-cy%)^2)):err=0:PROCpcursor:IF
 ERR=17 THEN ENDPROC
2280 IF err=5 AND ERR=17 THEN err=0:END
PROC
2290 IF ERR=17 PROCpcursor:ENDPROC
2300 *FX 4,0
2310 REPORT:PRINT "at line ";ERL:END
2320 :
2330 DEF PROCmess(T$)
2340 PRINT TAB(0,0);STRING$(20," ");
2350 PRINT TAB(0,0);T$;
2360 ENDPROC
2370 :
2380 DEF FNsure
2390 PROCmess("Quit? (Y/N)")
2400 REPEAT A=(GET AND 223)
2410 UNTIL CHR$(A)="Y" OR CHR$(A)="N"
2420 IF CHR$(A)="Y" THEN =TRUE
2430 PROCmess("")
2440 =FALSE
2450 :
2460 DEF PROCpcursor
2470 GCOL 4,0
2480 MOVE x%+8,y%:DRAW x%-8,y%
2490 MOVE x%,y%-8:DRAW x%,y%+8
2500 MOVE x%,y%
2510 ENDPROC
2520 :
2530 DEF PROCmove
2540 A%=GET
2550 gap%=4+(4*INKEY-1)*-1
2560 gap%=gap%+(32*INKEY-2)*-1
2570 GCOL 4,0
2580 PROCpcursor
2590 IF A%=137 PROCmovert
2600 IF A%=136 PROCmovelt
2610 IF A%=139 PROCmoveup
2620 IF A%=138 PROCmovedn
2630 GCOL 4,0
2640 PROCpcursor
2650 ENDPROC
2660 :
2670 DEF PROCmovert
2680 IF (x%+gap%)>xmax% THEN VDU 7:ENDP
ROC
2690 x%=x%+gap%
2700 ENDPROC
```

Continued ▶

◀ Joe's Jottings listing 1 continued

```
 2710 :
 2720 DEF PROCmovelt
 2730 IF (x%-gap%)<0 THEN VDU 7:ENDPROC
 2740 x%=x%-gap%
 2750 ENDPROC
 2760 :
 2770 DEF PROCmovedn
 2780 IF (y%-gap%)<0 THEN VDU 7:ENDPROC
 2790 y%=y%-gap%
 2800 ENDPROC
 2810 :
 2820 DEF PROCmoveup
 2830 IF (y%+gap%)>ymax% THEN VDU 7:ENDP
ROC
 2840 y%=y%+gap%
 2850 ENDPROC
 2860 :
 2870 DEF PROCsetup
 2880 xmax%=1278:ymax%=992
 2890 err=0
 2900 *FX 226,140
 2910 *FX 227,150
 2920 VDU 29,0;0;
 2930 VDU 24,0;0;1279;992;
 2940 COLOUR 135
 2950 CLS
 2960 COLOUR 0
 2970 x%=0:y%=0
 2980 lx%=0:ly%=0
 2990 *FX 4,1
 3000 *KEY 0 F
 3010 *KEY 1 D
 3020 *KEY 2 L
 3030 *KEY 3 O
 3040 *KEY 4 T
 3050 *KEY 5 C
 3060 *KEY 6 E
 3070 *KEY 7 S
 3080 *KEY 8 d
 3090 *KEY 9 Q
 3100 *FX 10,1
 3110 *FX 9,0
 3120 RESTORE 3170
 3130 DIM fcol$(15),igrex(15)
 3140 FOR loop%=0 TO 15
 3150 READ fcol$(loop%)
 3160 NEXT
 3170 DATA Black,Red,Green,Buttercup,Pur
ple,Magenta,Cyan,White
 3180 DATA Brown,Bright Red,Bright Green
,Orange,Dark Blue,Pink,Sky Blue,Primrose
 3190 FOR loop%=0 TO 15
 3200 READ igrex(loop%)
 3210 NEXT
 3220 DATA 0,&11,&22,&33,&44,&55,&66,&77
 3230 DATA &25,&15,&23,&13,&46,&75,&76,&
73
 3240 fcol=7
 3250 PROCmess("Glass="+fcol$(fcol))
 3260 ENDPROC
 3270 :
 3280 DEF PROChsf(sx%,sy%,c%)
 3290 PROCpcursor
 3300 GCOL0,c%
 3310 col%=POINT(sx%,sy%)
 3320 nx%=sx%:ny%=sy%
 3330 err=5
 3340 REPEAT
 3350 PROCfl
 3360 ny%=ny%+4
 3370 UNTIL POINT(nx%,ny%)<>col%
 3380 nx%=x%:ny%=sy%-4
 3390 D%=0:E%=0
 3400 REPEAT
 3410 PROCfl
 3420 ny%=ny%-4
 3430 UNTIL POINT(nx%,ny%)<>col%
 3440 err=0
 3450 PROCpcursor
 3460 ENDPROC
 3470 :
 3480 DEF PROCfl
 3490 LOCAL x,ex
 3500 x=nx%
 3510 REPEAT
 3520 x=x-8
 3530 UNTIL POINT(x,ny%)<>col%
 3540 x=x+8
 3550 ex=nx%
 3560 REPEAT
 3570 ex=ex+8
 3580 UNTIL POINT(ex,ny%)<>col%
 3590 ex=ex-8
 3600 nx%=(ex+x)DIV 2
 3610 MOVE x,ny%:DRAW ex,ny%
 3620 ENDPROC
 3630 :
 3640 DEF PROCdump
 3650 PROCmess("PRINTOUT? Y/N")
 3660 REPEAT A=(GET AND 223)
 3670 UNTIL CHR$(A)="Y" OR CHR$(A)="N"
 3680 IF CHR$(A)="N" PROCmess(""):ENDPRO
C
 3690 PROCmess("SPACE WHEN READY!")
 3700 REPEAT UNTIL GET=32
 3710 PROCmess("")
 3720 PROCpcursor
 3730 IF printer$="INT2" PROCsetcols:PRO
Cdump2:PROCpcursor:ENDPROC
 3740 IF printer$="INT1" PROCd(&59):PROC
pcursor:ENDPROC
 3750 PROCd(67)
 3760 PROCpcursor
 3770 ENDPROC
 3780 :
 3790 DEF PROCsetcols
 3800 VDU 2,1,27,1,ASC("s"),1,16
 3810 FOR loop%=0 TO 15
 3820 VDU 1,igrex(loop%)
 3830 NEXT
 3840 VDU 3
 3850 ENDPROC
 3860 :
 3870 DEF PROCd(t%)
 3880 VDU 2
 3890 FOR r%=990 TO 0 STEP -2
 3900 VDU 1,27,1,t%,1,80
 3910 FOR p%=1 TO 4
 3920 IF p%=3 THEN p%=4
 3930 FOR b%=0 TO 79
 3940 by%=0
 3950 FOR bit%=0 TO 4 STEP 4
 3960 c%=POINT(b%*16+(bit%*2),r%)
 3970 by%=by%*16+15*SGN(c% AND p%)
 3980 NEXT
 3990 VDU 1,by%
 4000 NEXT:NEXT:NEXT
 4010 VDU 3
 4020 PROCmess("finished printing")
 4030 A=INKEY(300)
 4040 PROCmess("")
 4050 ENDPROC
 4060 :
 4070 DEF PROCdump2
 4080 VDU 2
```

Continued ▶

JOE'S JOTTINGS

◀ **Joe's Jottings listings listing 1 continued**

```
4090 FOR r%=990 TO 0 STEP -2
4100 VDU 1,27,1,ASC("u"),1,2,1,640 MOD 256,
4110 FOR b%=0 TO 1279 STEP 2
4120 VDU 1,POINT(b%,r%)
4130 NEXT:NEXT
4140 VDU 3
4150 PROCmess("finished printing")
4160 A=INKEY(300)
4170 PROCmess("")
4180 ENDPROC
4190 :
4200 DEF PROCc2(s%,q%,r%)
4210 LOCAL x,y
4220 RESTORE 4310
4230 READ x,y
4240 MOVE x*r%/512+s%,y*r%/512+q%
4250 FOR loop=1 TO 20
4260 READ x,y
4270 DRAW x*r%/512+s%,y*r%/512+q%
4280 NEXT
4290 ENDPROC
4300 :
4310 DATA 512,0,487,158,414,301,301,414,158,487,0,512,-158,487,-301,414,-414,301,-487,158,-512,0,-487,-158,-414,-301,-301,-414,-158,-487,0,-512,158,-487,301,-414,414,-301,487,-158,512,0
```

Listing 2. PACK source code

```
10 REM Packing Program
20 REM by Joe Telford
30 REM for B/B+/M/C/E with Basic 2
40 REM (C) Acorn User April 1988
50 :
60 adrs=&70
70 ptrlochi=&F7
80 ptrloclow=&F6
90 bloc=&72
100 nloc=&73
110 handle=&74
120 openout=&80
130 osfind=&FFCE
140 osbput=&FFD4
150 osrdsc=&FFB9
160 osargs=&FFDA
170 gsinit=&FFC2
180 gsread=&FFC5
190 start%=&900
200 FOR pass=0 TO 3 STEP 3
210 P%=start%
220 [OPTpass
230 LDX #adrs
240 LDY #0
250 LDA #1
260 JSR osargs
270 LDA adrs
280 STA &F2
290 LDA adrs+1
300 STA &F3
310 LDY #0
320 CLC
330 .getchr
340 JSR gsinit
350 BEQ crash
360 JMP across
370 .crash
380 BRK
390 EQUB &80
400 EQUS "PACK <fname>"
410 BRK
420 .across
430 JSR gsread
440 BCS out
450 STA buffer-1,Y
460 JMP across
470 .out
480 INY
490 LDA #13
500 STA buffer-1,Y
510 LDY #buffer DIV 256
520 LDX #buffer MOD 256
530 LDA #openout
540 JSR osfind
550 CMP #0
560 BNE setup
570 BRK
580 EQUB &81
590 EQUS "Can't Pack that file!"+CHR$13
600 BRK
610 .setup
620 STA handle
630 LDA #&FF
640 STA ptrloclow
650 LDA #&2F
660 STA ptrlochi
670 .mainloop
680 CLC
690 JSR increment
700 STA bloc
710 LDA ptrlochi
720 CMP #&80
730 BEQ exit
740 LDA #0
750 STA nloc
760 .counter
770 INC nloc
780 JSR increment
790 CMP bloc
800 BNE endcount
810 LDA nloc
820 CMP #&FF
830 BNE counter
840 .endcount
850 DEC ptrloclow
860 LDA ptrloclow
870 CMP #&FF
880 BNE on
890 DEC ptrlochi
900 .on
910 LDA bloc
920 LDY handle
930 JSR osbput
940 LDA nloc
950 LDY handle
960 JSR osbput
```

Continued ▶

◀ **Joe's Jottings listing 2 continued**

```
970 JMP mainloop
980 .exit
990 LDY handle
1000 LDA #0
1010 JSR osfind
1020 RTS
1030 .increment
1040 INC ptrloclow
1050 BNE over
1060 INC ptrlochi
1070 .over
1080 LDY #0
1090 JSR osrdsc
1100 RTS
1110 .buffer
1120 ]
1130 NEXT
1140 :
1150 P%=0
1160 FOR I%=&900 TO &9B9
1170 P%=P%+?(I%)
1180 NEXT I%
1190 IF P%<>23135 PRINT "Error in program - Please check listing":END
1200 :
1210 PRINT "Press <SPACE> to save code."
1220 REPEAT UNTIL GET=32
1230 *SAVE PACK FFFF0900+100
```

Listing 3. UNPACK source code

```
10 REM UnPacking Program
20 REM by Joe Telford
30 REM for B/B+/M/C/E with Basic 2
40 REM (C) Acorn User April 1988
50 :
60 adrs=&70
70 ptrlochi=&D7
80 ptrloclow=&D6
90 bloc=&72
100 nloc=&73
```

Continued ▶

WORDPROCESSING

◀ **Joe's Jottings listing 3 continued**

```
110 handle=&74
120 openin=&40
130 osfind=&FFCE
140 osbget=&FFD7
150 oswrsc=&FFB3
160 osargs=&FFDA
170 gsinit=&FFC2
180 gsread=&FFC5
190 start%=&900
200 FOR pass=0 TO 3 STEP 3
210 P%=start%
220 [OPT pass
230 LDX #adrs
240 LDY #0
250 LDA #1
260 JSR osargs
270 LDA adrs
280 STA &F2
290 LDA adrs+1
300 STA &F3
310 LDY #0
320 CLC
330 .getchr
340 JSR gsinit
350 BEQ crash
360 JMP across
370 .crash
380 BRK
390 EQUB &82
400 EQUS "UNPACK <fname>"
410 BRK
420 .across
430 JSR gsread
440 BCS out
450 STA buffer-1,Y
460 JMP across
470 .out
480 INY
490 LDA #13
500 STA buffer-1,Y
510 LDY #buffer DIV 256
520 LDX #buffer MOD 256
530 LDA #openin
540 JSR osfind
550 CMP #0
560 BNE setup
570 BRK
580 EQUB &83
590 EQUS "Can't find that file!"+CHR$13
600 BRK
610 .setup
620 STA handle
630 LDA #&FF
640 STA ptrloclow
650 LDA #&2F
660 STA ptrlochi
670 .getchars
680 CLC
690 LDY handle
700 JSR osbget
710 STA bloc
720 BCS exit
730 LDY handle
740 JSR osbget
750 STA nloc
760 BCS exit
770 .loop
780 INC ptrloclow
790 BNE over
800 INC ptrlochi
810 .over
820 LDY #0
830 LDA bloc
840 JSR oswrsc
850 DEC nloc
860 BNE loop
870 BEQ getchars
880 .exit
890 LDY handle
900 LDA #0
910 JSR osfind
920 RTS
930 .buffer
940 ]
950 NEXT
960 :
970 P%=0
980 FOR I%=&900 TO &99B
990 P%=P%+?I%
1000 NEXT I%
1010 IF P%<>18459 PRINT "Error is program - Please check listing":END
1020 :
1030 PRINT "Press <SPACE> to save code."
1040 REPEAT UNTIL GET=32
1050 *SAVE UNPACK FFFF0900+100
```

See Turning Out the Tables, page 93

Listing 1. *View* table maker

```
10 REM View table maker
20 REM by Colin M. Ferrington
30 REM for BBC B/B+/M/C
40 REM (c) Acorn User April 1988
50 :
60 MODE 7
70 PROCinit
80 PROCname
90 PROCdata
100 PROCmargin
110 PROCboxes
120 *FX 12,0
130 MODE 7
140 END
150 :
160 DEF PROCinit
170 DIM opt% 300
180 co$=CHR$(&80)
190 PROCdwidth(9,1,131,157,132,"View Table Maker   ",156)
200 *FX 11,0
210 ENDPROC
220 :
230 DEF PROCname
240 REPEAT
250 VDU 28,0,13,39,10,12
260 PRINT TAB(9,0);CHR$(131);"Name for table file?  ";
270 INPUT TAB(9,2)" " name$
280 IF LEN(name$)>7 VDU 7
290 UNTIL (LEN(name$)<8) AND (LEN(name$)>0)
300 drive%=FNoption("Destination drive for "+name$+"?","0,1,2,3")-1
310 name$=":"+STR$(drive%)+"."+name$
320 F%=OPENIN(name$)
330 CLOSE #F%
340 IF F%=0 THEN F%=OPENOUT(name$):ENDPROC
350 option%=FNoption("File exists - overwrite?","Yes,No")
360 IF option%=1 PROCoscli("DEL."+name$):F%=OPENOUT(name$):ENDPROC
370 IF option%=2 THEN PROCname:ENDPROC
380 :
390 DEF PROCdata
400 VDU 28,0,13,39,10,12
410 FOR I%=1 TO 3
420 PRINT TAB(9,0)CHR$(131);
430 IF I%=1 PRINT "Number of columns?";
440 IF I%=2 PRINT " Number of rows?";
450 IF I%=3 PRINT "Maximum lines/row?";
460 *FX 21,0
470 REPEAT
```

Continued ▶

◄ Turning Out the Tables listing 1 continued

```
480 INPUT TAB(17,2)" " N%
490 UNTIL N%>0
500 IF I%=1 columns%=N%
510 IF I%=2 rows%=N%
520 IF I%=3 lines%=N%
530 CLS
540 NEXT
550 blanks%=FNoption("Blank lines between rows?","0,1,2,3")-1
560 ON ERROR GOTO 610
570 DIM C$(rows%,lines%,columns%),Width% columns%,Lines% rows%,just columns%
580 DIM field% columns%,places% columns%,type% columns%
590 ON ERROR OFF
600 GOTO 670
610 CLS
620 IF ERR=10 OR ERR=11 PRINT "Table too big!"; ELSE REPORT
630 CLOSE #0
640 PRINT ''"Press any key to restart";
650 A=GET
660 RUN
670 CLS
680 FOR J=1 TO columns%
690 Width%?J=0
700 FOR I=1 TO rows%
710 Lines%?I=0
720 IF I>1 GOTO 790
730 VDU 28,0,8,39,7,12
740 PROCdwidth(12,0,131,157,132,"Column "+STR$(J)+"  ",156)
750 type%?J=FNoption("Data type","String,Numeric")
760 IF type%?J=2 field%?J=FNoption("Numeric field width","4,5,6,7,8,9,10")+3
770 IF type%?J=2 places%?J=FNoption("Decimal places","0,1,2,3,4,5,6")-1
780 just?J=FNoption("Data to be","Left-justified,Right-justified,Centred")
790 FOR K%=1 TO lines%
800 C$(I,K%,J)=""
810 NEXT
820 NEXT
830 NEXT
840 VDU 28,0,24,39,3,12
850 PROCdwidth(0,1,131,157,132,"  Row number      Column number      ",32)
860 FOR column%=1 TO columns%
870 VDU 28,0,24,39,7
880 PROCdwidth(24,0,32,32,32,"     ",32)
890 PROCdwidth(24,0,32,32,131,STR$(column%),32)
900 FOR row%=1 TO rows%
910 VDU 28,0,24,39,7
920 PROCdwidth(6,0,32,32,32,"     ",32)
930 PROCdwidth(6,0,32,32,131,STR$(row%),32)
940 line%=0
950 char%=0
960 last%=FALSE
970 VDU 28,0,24,39,10,12
980 REPEAT
990 line%=line%+1
1000 PRINT "  Line ";STR$(line%);
1010 INPUT LINE" ? " c$
1020 IF c$="@" c$="":last%=TRUE
1030 IF type%?column%=2 c$=FNformat(c$,places%?column%,field%?column%)
1040 c$=" "+c$+" "
1050 IF LEN(c$)>Width%?column% Width%?column%=LEN(c$)
1060 C$(row%,line%,column%)=c$
1070 UNTIL last%=TRUE OR line%=lines%
1080 IF last% line%=line%-1
1090 IF line%>Lines%?row% Lines%?row%=line%
1100 CLS
1110 VDU 7
1120 NEXT
1130 NEXT
1140 width%=0
1150 FOR I=1 TO columns%
1160 width%=width%+Width%?I+1
1170 NEXT
1180 width%=width%+2
1190 ENDPROC
1200 :
1210 DEF PROCmargin
1220 IF width%<75 margin%=(74-width%) DIV 2
1230 IF width%>74 margin%=0
1240 M$=STR$(margin%)
1250 PROCbput(co$+"LM"+M$+CHR$(&0D))
1260 BPUT #F%,&81:BPUT #F%,&2E:BPUT #F%,&2E
1270 FOR I=1 TO columns%
1280 FOR J=1 TO Width%?I+1
1290 BPUT #F%,&2E
1300 NEXT
1310 NEXT
1320 BPUT #F%,&3C:BPUT #F%,&0D
1330 ENDPROC
1340 :
1350 DEF PROCboxes
1360 VDU 28,0,24,39,3,12
1370 PROCdwidth(0,3,131,157,132,"  Storing table   "+name$+"  ",32)
1380 FOR B%=1 TO rows%
1390 FOR L%=1 TO Lines%?B%
1400 PROCbput(" ")
1410 FOR C%=1 TO columns%
1420 len=Width%?C%-LEN(C$(B%,L%,C%))
1430 justify%=3
1440 IF B%>1 justify%=just?C%
1450 IF justify%=1 PROCbput(C$(B%,L%,C%)+STRING$(len," "))
1460 IF justify%=2 PROCbput(STRING$(len," ")+C$(B%,L%,C%))
1470 IF justify%=3 L1%=INT(len/2):L2%=len-L1%
1480 IF justify%=3 PROCbput(STRING$(L1%," ")+C$(B%,L%,C%)+STRING$(L2%," "))
1490 PROCbput(" ")
1500 NEXT
1510 BPUT #F%,&0D
1520 NEXT
1530 IF blanks%>0:FOR I=1 TO blanks%:PROCbput(" "+CHR$(&0D)):NEXT
1540 NEXT
1550 CLOSE #F%
1560 CLS
1570 *FX 21,0
1580 ENDPROC
1590 :
1600 DEF PROCbput(S$)
1610 LOCAL I
1620 FOR I=1 TO LEN(S$)
1630 BPUT #F%,ASC(MID$(S$,I,1))
1640 NEXT
1650 ENDPROC
1660 :
1670 DEF PROCdwidth(X,Y,c1%,c2%,c3%,M$,c4%)
```

Continued ►

◀ **Turning Out the Tables listing 1 continued**

```
 1680 PRINT TAB(X,Y) CHR$(141);CHR$(c1%)
;CHR$(c2%);CHR$(c3%);M$;CHR$(c4%);
 1690 PRINT TAB(X,Y+1) CHR$(141);CHR$(c1
%);CHR$(c2%);CHR$(c3%);M$;CHR$(c4%);
 1700 ENDPROC
 1710 :
 1720 DEF FNoption(Q$,O$)
 1730 LOCAL option%,I%,J%,o$,A
 1740 *FX 4,1
 1750 VDU 28,0,12,39,10,12,23,1,0;0;0;0;
 1760 I%=0:J%=0
 1770 REPEAT
 1780 J%=J%+1
 1790 O%=20*(J%-1)
 1800 REPEAT
 1810 I%=I%+1
 1820 ?(opt%+O%)=ASC(MID$(O$,I%,1))
 1830 O%=O%+1
 1840 UNTIL MID$(O$,I%+1,1)="," OR I%=LE
N(O$)
 1850 I%=I%+1
 1860 ?(opt%+O%)=13
 1870 UNTIL I%>LEN(O$) OR J%=12
 1880 option%=1
 1890 PRINT SPC((39-LEN(Q$)) DIV 2);CHR$
(131);Q$;
 1900 VDU 28,0,12,39,12,12
 1910 REPEAT
 1920 o$=$(opt%+(option%-1)*20)
 1930 PRINT SPC((40-LEN(o$)) DIV 2);o$;
 1940 A=GET
 1950 VDU 12
 1960 IF A=136 option%=option%-1
 1970 IF A=137 option%=option%+1
 1980 IF option%<1 option%=J% ELSE IF op
tion%>J% option%=1
 1990 UNTIL A=13
 2000 *FX 4,0
 2010 VDU 23,1,1,0;0;0;0;
 2020 =option%
 2030 :
 2040 DEF FNformat(A$,P%,W%)
 2050 LOCAL I%,invalid%,A%
 2060 A%=@%
 2070 invalid%=FALSE
 2080 I%=0
 2090 IF MID$(A$,1,1)="+" I%=1
 2100 IF MID$(A$,1,1)="-" I%=1
 2110 REPEAT
 2120 I%=I%+1
 2130 IF MID$(A$,I%,1)="." GOTO 2150
 2140 IF ASC(MID$(A$,I%,1))<48 OR ASC(MI
D$(A$,I%,1))>57 invalid%=TRUE
 2150 UNTIL I%=LEN(A$) OR invalid%=TRUE
 2160 IF invalid%: =A$
 2170 @%=W%+256*P%+&1020000
 2180 A$=STR$(VAL(A$))
 2190 IF LEN(A$)<W% A$=STRING$(W%-LEN(A$
)," ")+A$
 2200 @%=A%
 2210 IF P%=0 A$=MID$(A$,1,LEN(A$)-1)
 2220 =A$
 2230 :
 2240 DEF PROCoscli(string$)
 2250 DIM X% &FF
 2260 Y%=X% DIV 256
 2270 $X%=string$
 2280 CALL &FFF7
 2290 ENDPROC
```

See Art Comes Undone, page 98

Listing 1. SETUP

```
  10 REM Undo Setup
  20 REM by Michael Isa
rd
  30 REM for B with SWR
/M
  40 REM (c) Acorn User
 April 1988
  50 :
  60 MODE 7
  70 *LOAD AMXIN 7600
  80 :
  90 ?&7632=ASC("U")
 100 ?&7639=ASC("U")
 110 ?&763A=ASC("U")
 120 ?&763B=ASC("U")
 130 :
 140 ?&7665=?&7665 AND
126
 150 ?&7666=?&7666 AND
252
 160 :
 170 $&7690="Store"
 180 $&7696="QSave"
 190 $&769C="QLoad"
 200 ?&76A1=0
 210 :
 220 *SAVE AMXIN 7600 +
F5 6D0 600
```

Listing 2. Undo source code

```
  10 REM Undo
  20 REM by Michael Isa
rd
  30 REM for B with SWR
/M
  40 REM (c) Acorn User
 April 1988
  50 :
  60 HIMEM=&7400
  70 ram=&D
  80 FOR pass%=4 TO 6 S
TEP 2
  90 P%=&2800
 100 O%=&7400
 110 [OPT pass%
 120 LDA #entry MOD 256
 130 STA &600
 140 LDA #entry DIV 256
 150 STA &601
 160 STA &604
 170 RTS
 180 .entry
 190 CPY #46
 200 BEQ undo
 210 CPY #53
 220 BNE nst
 230 JMP store
 240 .nst
 250 CPY #54
 260 BNE nsa
 270 JMP save
 280 .nsa
 290 CPY #55
 300 BNE out
 310 JMP load
 320 .out
 330 LDA #0
 340 RTS
 350 .undo
 360 CPX #1
 370 BNE realentry
 380 LDA #1
 390 RTS
 400 .realentry
 820 LDA &F4
 830 STA &82
 840 LDA #ram
 850 STA &F4
 860 STA &FE30
 870 LDX #6
 880 .checkmem
 890 LDA &AE00,X
 900 CMP mess,X
 910 BNE exit
```

Continued ▶

◀ **Art Comes Undone listing 2 continued**

```
920 DEX
930 BPL checkmem
940 JMP swap
950 .mess
960 EQUS "Picture"
970 .exit
980 LDA &82
990 STA &F4
1000 STA &FE30
1010 LDA #1
1020 RTS
1030 .swap
1040 LDA #&90
1050 STA &83
1060 LDA #&37
1070 STA &84
1080 LDA #&00
1090 STA &85
1100 LDA #&80
1110 STA &86
1120 LDY #&00
1130 .lineswap
1140 LDA (&83),Y
1150 STA &87
1160 LDA (&85),Y
1170 STA (&83),Y
1180 LDA &87
1190 STA (&85),Y
1200 DEY
1210 BNE lineswap
1220 INC &84
1230 INC &86
1240 .sechalf
1250 LDA (&83),Y
1260 STA &87
1270 LDA (&85),Y
1280 STA (&83),Y
1290 LDA &87
1300 STA (&85),Y
1310 DEY
1320 BNE sechalf
1330 LDA #&80
1340 CLC
1350 ADC &83
1360 STA &83
1370 LDA #&01
1380 ADC &84
1390 STA &84
1400 INC &86
1410 LDA &86
1420 CMP #&AE
1430 BNE lineswap
1440 JMP exit
1450 .store
1460 LDA &F4
1470 STA &82
1480 LDA #ram
1490 STA &F4
1500 STA &FE30
1510 LDA #&90
1520 STA &83
1530 LDA #&37
1540 STA &84
1550 LDA #&00
1560 STA &85
1570 LDA #&80
1580 STA &86
1590 LDY #&00
1600 .linestore
1610 LDA (&83),Y
1620 STA (&85),Y
1630 DEY
1640 BNE linestore
1650 INC &84
1660 INC &86
1670 .secstore
1680 LDA (&83),Y
1690 STA (&85),Y
1700 DEY
1710 BNE secstore
1720 LDA #&80
1730 CLC
1740 ADC &83
1750 STA &83
1760 LDA #&01
1770 ADC &84
1780 STA &84
1790 INC &86
1800 LDA &86
1810 CMP #&AE
1820 BNE linestore
1830 LDX #6
1840 .chstore
1850 LDA mess,X
1860 STA &AE00,X
1870 DEX
1880 BPL chstore
1890 JMP exit
1900 .save
1910 JSR &BFF9
1920 EQUW &090A
1930 EQUS "Enter file name"
1940 EQUW &0A0D
1950 EQUB 9
1960 EQUS "|"
1970 EQUB 0
1980 JSR &BFE4
1990 BCC nesc
2000 LDA #2
2010 STA &14
2020 LDX #&14
2030 LDY #0
2040 LDA #65
2050 JSR &FFF1
2060 LDA #1
2070 RTS
2080 .nesc
2090 LDA #2
2100 STA &14
2110 LDX #&14
2120 LDY #0
2130 LDA #65
2140 JSR &FFF1
2150 JSR store
2160 LDA #ram
2170 STA &F4
2180 STA &FE30
2190 LDA #0
2200 STA &83
2210 STA &85
2220 LDA #&80
2230 STA &84
2240 LDA #&30
2250 STA &86
2260 LDA #&2E
2270 STA &87
2280 .ramout
2290 LDA (&83),Y
2300 STA (&85),Y
2310 DEY
2320 BNE ramout
2330 INC &84
2340 INC &86
2350 DEC &87
2360 BNE ramout
2370 LDA &82
2380 STA &F4
2390 STA &FE30
2400 LDA &202
2410 STA &89
2420 LDA &203
2430 STA &8A
2440 LDA #bkv MOD 256
2450 STA &202
2460 LDA #bkv DIV 256
2470 STA &203
2480 LDA #0
2490 TAY
2500 JSR &FFCE
2510 LDA #1
2520 STA &5E00
2530 LDA #7
2540 STA &5E01
2550 LDA &58
2560 AND #7
2570 STA &5E02
2580 LDA &59
2590 AND #7
2600 ASL A
2610 ASL A
2620 ASL A
2630 ADC &5E02
2640 STA &5E02
2650 LDA &5A
2660 AND #7
2670 STA &5E03
2680 LDA &5B
2690 AND #7
2700 ASL A
2710 ASL A
2720 ASL A
2730 ADC &5E03
2740 STA &5E03
2750 LDA #0
2760 STA &5E04
2770 STA &5E05
2780 LDA #&17
2790 STA &5E06
2800 LDA #&20
2810 STA &5E07
2820 LDA #&FF
2830 STA &5E08
2840 STA &5E09
2850 LDA #0
2860 STA &5E0A
2870 LDA #&30
2880 STA &5E0B
2890 LDA #0
2900 STA &5E0C
2910 STA &5E0D
2920 STA &5E10
2930 STA &5E11
2940 LDA #0
2950 STA &5E0E
2960 LDA #&5E
2970 STA &5E0F
2980 LDX #0
2990 LDY #&5E
3000 LDA #0
3010 JSR &FFDD
3020 JSR cleanup
3030 LDA &89
```

Continued ▶

◀ Art Comes Undone listing 2 continued

```
3040 STA &202
3050 LDA &8A
3060 STA &203
3070 RTS
3080 .cleanup
3090 LDA &53
3100 STA &88
3110 LDA #0
3120 STA &53
3130 JSR &BFF6
3140 JSR &BFD8
3150 LDA &88
3160 STA &53
3170 BEQ nofile
3180 LDA #&C0
3190 LDX #&14
3200 LDY #4
3210 JSR &FFCE
3220 STA &53
3230 .nofile
3240 JMP undo
3250 .bkv
3260 LDY #0
3270 .transmess
3280 LDA (&FD),Y
3290 STA errmess,Y
3300 BEQ emess
3310 INY
3320 BNE transmess
3330 .emess
3340 LDA #errmess MOD 2
56
3350 STA &FD
3360 LDA #errmess DIV 2
56
3370 STA &FE
3380 JSR cleanup
3390 LDA &89
3400 STA &202
3410 LDA &8A
3420 STA &203
3430 JMP (&202)
3440 .load
3450 JSR &BFF9
3460 EQUW &090A
3470 EQUS "Enter file n
ame"
3480 EQUW &0A0D
3490 EQUB 9
3500 EQUS "|"
3510 EQUB 0
3520 JSR &BFE4
3530 BCC nesc2
3540 LDA #2
3550 STA &14
3560 LDX #&14
3570 LDY #0
3580 LDA #65
3590 JSR &FFF1
3600 LDA #1
3610 RTS
3620 .nesc2
3630 LDA #2
3640 STA &14
3650 LDX #&14
3660 LDY #0
3670 LDA #65
3680 JSR &FFF1
3690 JSR store
3700 LDA &202
3710 STA &89
3720 LDA &203
3730 STA &8A
3740 LDA #bkv MOD 256
3750 STA &202
3760 LDA #bkv DIV 256
3770 STA &203
3780 LDA #0
3790 TAY
3800 JSR &FFCE
3810 LDA #1
3820 STA &5E00
3830 LDA #7
3840 STA &5E01
3850 LDA #5
3860 LDX #0
3870 LDY #&5E
3880 JSR &FFDD
3890 BNE filethere
3900 EQUW &FF00
3910 EQUS "File not fou
nd"
3920 EQUB 0
3930 .filethere
3940 LDA &5E06
3950 CMP #&17
3960 BNE nsize
3970 LDA &5E07
3980 CMP #&20
3990 BEQ oksize
4000 .nsize
4010 EQUW &FF00
4020 EQUS "Not AMX Art
sized"
4030 EQUB 0
4040 .oksize
4050 LDA #19
4060 JSR &FFEE
4070 LDA #0
4080 JSR &FFEE
4090 LDA &5E02
4100 AND #7
4110 JSR &FFEE
4120 JSR zeroes
4130 LDA #19
4140 JSR &FFEE
4150 LDA #1
4160 JSR &FFEE
4170 LDA &5E02
4180 LSR A
4190 LSR A
4200 LSR A
4210 AND #7
4220 JSR &FFEE
4230 JSR zeroes
4240 LDA #19
4250 JSR &FFEE
4260 LDA #2
4270 JSR &FFEE
4280 LDA &5E03
4290 AND #7
4300 JSR &FFEE
4310 JSR zeroes
4320 LDA #19
4330 JSR &FFEE
4340 LDA #3
4350 JSR &FFEE
4360 LDA &5E03
4370 LSR A
4380 LSR A
4390 LSR A
4400 AND #7
4410 JSR &FFEE
4420 JSR zeroes
```

Continued ▶

◀ Art Comes Undone listing 2 continued

```
4430 LDA #0
4440 STA &5E02
4450 STA &5E04
4460 STA &5E05
4470 STA &5E06
4480 LDA #&30
4490 STA &5E03
4500 LDA #&FF
4510 JSR &FFDD
4520 LDA &89
4530 STA &202
4540 LDA &8A
4550 STA &203
4560 LDA #ram
4570 STA &F4
4580 STA &FE30
4590 LDA #0
4600 STA &83
4610 STA &85
4620 LDA #&30
4630 STA &84
4640 LDA #&80
4650 STA &86
4660 LDA #&2E
4670 STA &87
4680 LDY #0
4690 .ramin
4700 LDA (&83),Y
4710 STA (&85),Y
4720 DEY
4730 BNE ramin
4740 INC &84
4750 INC &86
4760 DEC &87
4770 BNE ramin
4780 LDA &82
4790 STA &F4
4800 STA &FE30
4810 JMP cleanup
4820 .zeroes
4830 LDA #0
4840 JSR &FFEE
4850 JSR &FFEE
4860 JMP &FFEE
4870 .errmess
4880 ]
4890 NEXT
4900 sum%=0
4910 FOR X%=&7400 TO O%
-1
4920 sum%=sum%+?X%
4930 NEXT
4940 IF sum%<>&19C2B TH
EN PRINT "Checksum Error
.":END
4950 OSCLI ("SAVE :0.U.
userU 7400 +"+STR$~(O%-&
7400)+" 2800 2800")
```

Listing 3. Change for true 'Undo'

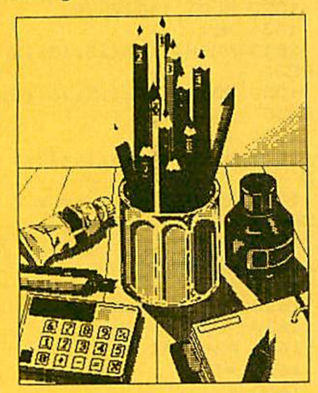
```
380 JMP store
390 :
```

Listing 4. Changes for two RAM banks

```
   70 ram1=&A:ram2=&D
  200 BEQ un
  230 JMP st
  350 .un
  380 LDA #ram2:STA &8B
  390 JMP store
  410 LDA #(entry DIV 25
6)-3
  420 STA &604
  430 LDA #4
  431 STA wstore
  440 LDX #wstore MOD 25
6
  450 LDY #wstore DIV 25
6
  460 LDA #65
  461 JSR &FFF1
  470 JSR &BFD2
  480 .choose
  490 LDX #lstore MOD 25
6
  500 LDY #lstore DIV 25
6
  510 LDA #68
  511 JSR &FFF1
  520 LDX #mstore MOD 25
6
  530 LDY #mstore DIV 25
6
  540 LDA #5
  541 STA mstore
  550 LDA #65
  551 JSR &FFF1
  560 LDA mstore
  561 BEQ choose
  570 JSR &BFD5
  580 LDA #2
  581 STA wstore
  590 LDX #wstore MOD 25
6
  600 LDY #wstore DIV 25
6
  610 LDA #65
  611 JSR &FFF1
  620 LDA #entry DIV 256
  630 STA &604
  640 LDA mstore
  650 CMP #1
  651 BEQ untool
  660 LDA #ram1
  661 STA &8B
  662 JMP undo
  670 .untool
  680 LDA #ram2
  681 STA &8B
  690 JMP undo
  700 .wstore
  701 EQUW &8004
  710 EQUW &0025
  711 EQUW &1800
  720 EQUW &0A05
  721 EQUB &04
  730 EQUW mist
  731 EQUW &0000
  740 EQUW &0000
  741 EQUB 0
  750 .mist
  751 EQUS "Tool"
  752 EQUB &0D
  760 EQUS "Stored"
  761 EQUB 0
  770 .mstore
  771 EQUW &1805
  780 EQUW &2105
  781 EQUW &0002
  782 EQUW &0000
  790 .lstore
  791 EQUW &0800
  800 EQUW &0301
  810 .undo
  840 LDA &8B
 1444 .st
 1446 LDA #ram1
 1448 STA &8B
 1480 LDA &8B
 1904 LDA #ram2
 1906 STA &8B
 2160 LDA &8B
 3444 LDA #ram2
 3446 STA &8B
 4560 LDA &8B
```

Top of the List (see over)

Listing 1. LQ800 mode 1 dump



```
   10 REM MODE 1 LQ-800
 Dump
   20 REM by David Lawre
nce
   30 REM for B/B+/M/C/E
   40 REM (c) Acorn User
 April 1988
   50 :
   60 MODE 7
   70 PROCcode
   80 PROCchecksum
   90 PROCoscli("*SAVE 1
DUMP 900 "+STR$~P%)
  100 END
  110 :
  120 DEF PROCcode
  130 pos=&70:lines=&72:
chars=&73
  140 times=&74:map=&75:
dots=&76
  150 oswrch=&FFEE
  160 palette=&36F
  170 :
  180 FOR I%=0 TO 2 STEP
 2
  190 P%=&900
  200 [OPT I%
  210 .dump1
  220 LDA #0
  230 STA pos
  240 LDA #&30
  250 STA pos+1
  260 LDA #32
  270 STA lines
  280 .perline
  290 LDA #2
  300 JSR oswrch
  310 LDY #4
  320 .solloop
  330 LDX soldat,Y
  340 JSR print
  350 DEY
  360 BPL solloop
  370 LDA #80
  380 STA chars
  390 .perchar
  400 LDY #7
  410 .transfer
  420 LDA (pos),Y
  430 STA his,Y
  440 ASL A
  450 ASL A
  460 ASL A
  470 ASL A
  480 STA los,Y
  490 DEY
  500 BPL transfer
  510 LDA #4
  520 STA times
  530 .next
  540 LDX #7
  550 .getpixels
  560 LDA #0
  570 ASL his,X
  580 ROL A
  590 ASL los,X
  600 ROL A
  610 AND #3
  620 TAY
  630 LDA palette,Y
  640 STA pixels,X
  650 DEX
  660 BPL getpixels
  670 LDA #0
  680 STA map
  690 .perdot
  700 LDX #7
  710 .rotate
  720 LDA pixels,X
  730 CLC
  740 ADC map
  750 TAY
  760 LDA bitmap,Y
  770 LDY #3
  780 .ror
  790 LSR A
  800 ROR bytes+2
  810 ROR bytes+1
  820 ROR bytes
  830 DEY
  840 BNE rdr
  850 DEX
  860 BPL rotate
  870 LDY #2
  880 .doprint
  890 LDX bytes,Y
  900 JSR print
  910 DEY
  920 BPL doprint
  930 LDA map
  940 CLC
  950 ADC #8
  960 STA map
  970 CMP #24
  980 BNE perdot
  990 DEC times
 1000 BNE next
 1010 LDA pos
 1020 CLC
 1030 ADC #8
 1040 STA pos
 1050 BNE nothi
 1060 INC pos+1
 1070 .nothi
 1080 DEC chars
 1090 BNE perchar
 1100 LDY #6
 1110 .eolloop
 1120 LDX eoldat,Y
 1130 JSR print
 1140 DEY
 1150 BPL eolloop
 1160 DEC lines
 1170 BEQ endpage
 1180 JMP perline
 1190 .endpage
 1200 LDA #3
 1210 JMP oswrch
 1220 :
 1230 .print
 1240 LDA #1
 1250 JSR oswrch
 1260 TXA
 1270 JMP oswrch
```

Continued ▶

TOP OF THE LIST

◀ Top of the List listing 1 continued

```
1280 :
1290 .bytes
1300 OPT FNequb(0):OPT FNequb(0):OPT FNequb(0)
1310 :
1320 .his
1330 OPT FNequd(0):OPT FNequd(0)
1340 :
1350 .los
1360 OPT FNequd(0):OPT FNequd(0)
1370 :
1380 .pixels
1390 OPT FNequd(0):OPT FNequd(0)
1400 :
1410 .bitmap
1420 OPT FNequd(&00020507):OPT FNequd(&00050507)
1430 OPT FNequd(&02050707):OPT FNequd(&00000205)
1440 OPT FNequd(&00020207):OPT FNequd(&00020507)
1450 :
1460 .soldat
1470 OPT FNequb(960 DIV 256):OPT FNequb(960 MOD 256)
1480 OPT FNequb(39):OPT FNequb(42):OPT FNequb(27)
1490 :
1500 .eoldat
1510 OPT FNequb(00):OPT FNequb(00):OPT FNequb(36):OPT FNequb(27)
1520 OPT FNequb(24):OPT FNequb(74):OPT FNequb(27)
1530 ]
1540 NEXT
1550 ENDPROC
1560 :
1570 DEF FNequb(b%)
1580 ?P%=b%
1590 P%=P%+1
1600 =I%
1610 :
1620 DEF FNequd(b%)
1630 !P%=b%
1640 P%=P%+4
1650 =I%
1660 :
1670 DEF PROCoscli(string$)
1680 DIM X% &FF
1690 Y%=X% DIV 256
1700 $X%=string$
1710 CALL &FFF7
1720 ENDPROC
1730 :
1740 DEF PROCchecksum
1750 C=0
1760 FOR I%=&900 TO &9F6
1770 C=C+?(I%)
1780 NEXT I%
1790 IF C<>21567 PRINT "Check listing.":END
1800 ENDPROC
```

Listing 2. LQ800 mode 0 dump

*This month's 'Top of the list' consists of two programs for use with the Epson LQ800 printer. Although standard dumps will work with the LQ800, they do not make use of the full 24 pins. To use the mode 1 dump in your own program you should load in the machine code generated by listing 1 with '*LOAD 1DUMP 900', and then call the code with 'CALL &900'. Alternatively, you could use *RUN 1DUMP. Before using the mode 0 dump, you should save the code generated with '*SAVE 0DUMP 900 9FE'. The machine code can then be used as above. Both programs use a single page of memory at &900, which could be altered if necessary.*

```
10 REM Tiny MODE 0 LQ-800 Dump
20 REM by David Lawrence
30 REM for B/B+/M/C/E
40 REM (c) Acorn User April 1988
50 :
60 *FX 5,1
70 MODE 0
80 PROCcode
90 PROCchecksum
100 PROCdemo
110 CALL dump0
120 END
130 :
140 DEF PROCcode
150 pos1=&70:pos2=&72:pos3=&74
160 lines=&76:chars=&77:times=&78
170 oswrch=&FFEE
180 FOR I%=0 TO 2 STEP 2
190 P%=&900
200 :
210 [OPT I%
220 .dump0
230 LDY #6
240 .initloop
250 LDA init,Y
260 STA pos1,Y
270 DEY
280 BPL initloop
290 .perline
300 LDA #2
310 JSR oswrch
320 LDA #27
330 JSR print
340 LDA #42
350 JSR print
360 LDA #40
370 JSR print
380 LDA #640 MOD 256
390 JSR print
400 LDA #640 DIV 256
410 JSR print
420 LDA #80
430 STA chars
440 .perchar
450 LDY #7
460 .transfer
470 LDA (pos1),Y
480 STA space,Y
490 LDA (pos2),Y
500 STA space+8,Y
510 LDA (pos3),Y
520 STA space+16,Y
530 DEY
540 BPL transfer
550 LDA #8
560 STA times
570 .output
580 LDX #0
590 JSR rotate
600 LDX #8
610 JSR rotate
620 LDX #16
630 JSR rotate
640 DEC times
650 BNE output
660 LDY #0
670 JSR add8
680 LDY #2
690 JSR add8
700 LDY #4
710 JSR add8
720 DEC chars
730 BNE perchar
740 LDY #0
750 .eolloop
760 LDA eoldat,Y
770 JSR print
780 INY
790 CPY #7
800 BNE eolloop
810 LDY #0
820 JSR add500
830 LDY #2
840 JSR add500
850 LDY #4
860 JSR add500
870 DEC lines
880 BPL perline
890 LDA #13
900 JSR oswrch
910 LDA #3
920 JSR oswrch
930 RTS
940 :
950 .add8
960 LDA pos1,Y:CLC:ADC #8:STA pos1,Y
970 LDA pos1+1,Y:ADC #0:STA pos1+1,Y
980 RTS
990 :
1000 .add500
1010 LDA pos1,Y:CLC:ADC #0:STA pos1,Y
1020 LDA pos1+1,Y:ADC #5:STA pos1+1,Y
1030 RTS
1040 :
1050 .rotate
1060 CPX #16
1070 BNE notendline
1080 LDA lines
1090 BEQ print
1100 .notendline
1110 LDY #8
1120 LDA #0
1130 .rotloop
1140 ROL space,X
1150 ROL A
1160 INX
1170 DEY
1180 BNE rotloop
1190 :
1200 .print
1210 PHA
1220 LDA #1
1230 JSR oswrch
1240 PLA
1250 JMP oswrch
1260 :
1270 .space
1280 OPT FNequs(STRING$(24," "))
1290 :
1300 .init
1310 OPT FNequw(&3000)
1320 OPT FNequw(&3280)
1330 OPT FNequw(&3500)
1340 OPT FNequb(10)
1350 :
1360 .eoldat
1370 OPT FNequb(27):OPT FNequb(74):OPT FNequb(24)
1380 OPT FNequb(27):OPT FNequb(36):OPT FNequb(0):OPT FNequb(0)
1390 ]NEXT
1400 ENDPROC
1410 :
1420 DEF PROCdemo
1430 FOR I%=0 TO 32 STEP 8
1440 MOVE I%,I%
1450 DRAW 1279-I%,I%
1460 DRAW 1279-I%,1023-I%
1470 DRAW I%,1023-I%
1480 DRAW I%,I%
1490 NEXT
1500 FOR R%=0 TO 450 STEP 50
1510 MOVE 640,512
1520 PLOT 145,R%,0
1530 NEXT
1540 PRINT TAB(25,15);SPC30
1550 PRINT TAB(25,16);SPC30
1560 VDU 5
1570 MOVE 25*16,16*32+15
1580 PRINT "This is a MODE 0 demonstration"
1590 VDU 4
1600 ENDPROC
1610 :
1620 DEF FNequb(b%)
1630 ?P%=b%
1640 P%=P%+1
1650 =I%
1660 :
1670 DEF FNequw(b%)
1680 ?P%=b% MOD 256
1690 P%?1=b% DIV 256
1700 P%=P%+2
1710 =I%
1720 :
1730 DEF FNequs(b$)
1740 $P%=b$
1750 P%=P%+LEN(b$)
1760 =I%
1770 :
1780 DEF PROCchecksum
1790 C=0
1800 FOR I%=&900 TO &9FD
1810 C=C+?(I%)
1820 NEXT I%
1830 IF C<>24390 PRINT "Check listing.":END
1840 ENDPROC
```

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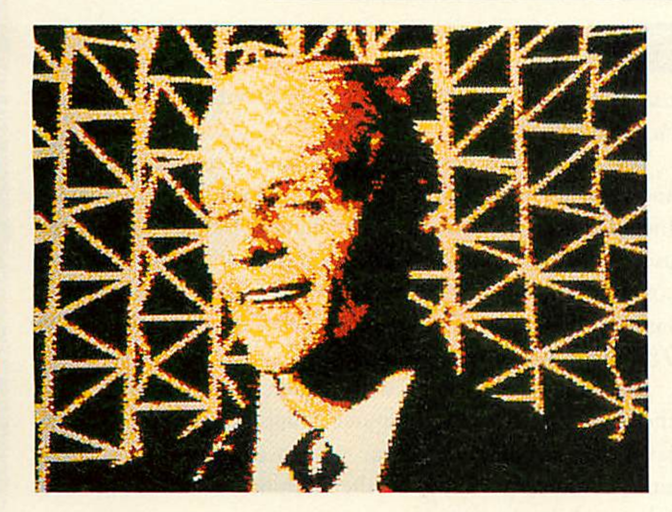
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OFFERS

PROGRAM LISTINGS



Don't be an April Fool: buy the disc!

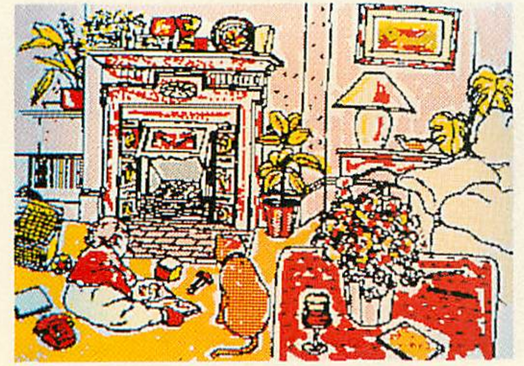
Bring St Paul's and Westminster Abbey into your home or classroom with Joe Telford's theologically-inspired program for designing stained glass windows. Joe's mode 2 graphics program allows you to design your favourite windows on screen and then print them on paper or acetate using a printer dump routine for the Integrex printer. To get the full effect all you need to do is back-light your printed designs.

Martin Phillips has written a program that will confuse your friends on April 1 1988! Make any micro misbehave using this events routine and leave chaos in your wake. Plus there are Hints & Tips on mailing lists with macro files.

If you have been avoiding using spreadsheets because the thought of *ViewSheet* terrifies you, then there is no longer cause for alarm. Bruce Smith has produced a *ViewSheet* file to accompany his Step by Step feature on the subject. This file will get you started on your spreadsheets. Also included on April's cassette and disc is a screen dump routine for 24-pin printers like the LQ800. Forum has produced a short program for assembling very long machine code routines. There is also a program which allows you to use the Copy key to copy whole line at once.

Archimedes owners will enjoy the airbrush tool we've added to *Artisan*. Please see page 15 to order your 3.5-inch version of the monthly discs. Turn to page 127 to order your 5.25-inch monthly disc or cassette for the BBC and Electron.

LISTINGS

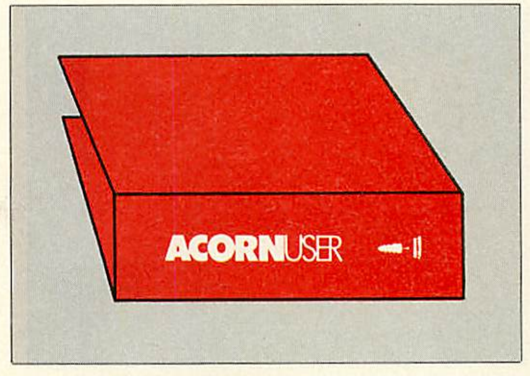


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Guarantee the priority delivery of your monthly listings by subscribing. Each month our discs contain the very best quality graphics, utilities and routines. A subscription to the monthly discs will save you hours of typing and de-bugging, leaving you time to enjoy and use the programs.

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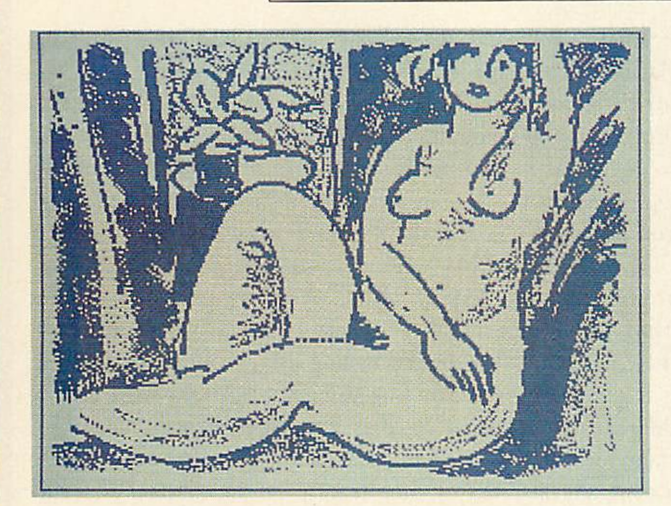
For only £4.95 your indispensible guide to the BBC micro can be kept in pristine condition.

Take the opportunity to catch up with some of the back issues of *Acorn User* magazine, discs or cassettes that you've missed. For a list of issue contents write to: Seran Haddick, 20-26 Brunswick Place, London N1 6DJ.

Acorn User order form on page 127 – 24-hour telephone service (0672) 40825

OFFERS

PORTFOLIO DISC



A Portfolio of micro masterpieces

BBC/B/ B+/M

Jonathan Inglis, freelance illustrator and Acorn's artist-in-residence for the launch of the Master series, has assembled a portfolio of his best work exclusively for *Acorn User* readers.

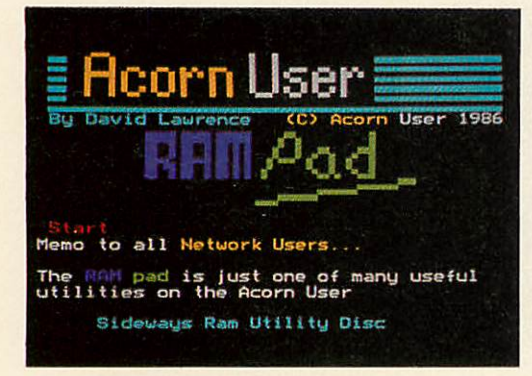
The disc, which costs £9.95, contains screens that national and regional publications have commissioned Jonathan to do. Included are representations of Seurat's 'Bathers', which was used by *Time Out* for a cover, and two *Acorn User* front covers; Willow from November 1986 and Magician from January 1986, as well as several which were commissioned by *The Times* newspaper group.

Jonathan Inglis is interested in the conversion of work by the great masters to computer graphics, and three of his favourites are on the disc for you to enjoy: Seurat's 'Riverside', Vermeer's 'Lady at the Virginal' and a copy of a lithograph by Matisse.

Pixel Editor and *Super Painter* have been incorporated to let you create your own masterpieces. *Pixel Editor* allows you draw in and alter the minute detail while *Super Painter* enables you to draw lines, texture your screen and shade by mixing the eight standard colours.

The *Portfolio* disc comes in 80-track 5.25-inch format, and makes the ideal gift for the graphics fan. Enclosed with the disc is a comprehensive instruction sheet telling you more about the pictures and how the artist created them.

DISCS



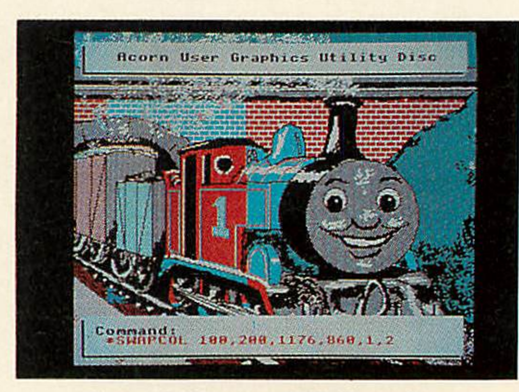
Disc for all sideways RAM users

BBC/B/ B+/M/ C

The *Sideways RAM Utilities* disc includes: *Ram-Pad* – your computer's answer to the pad and pen. *On-Screen Fonts* – a variety of print styles available in all graphics modes. * HLP ROM – add your own help text to call up when you're stuck. Standard ROM header for use when writing your own ROMs. * RLOOK to examine the contents of your ROMs and sideways RAM images.

There are many more utilities on this 40-track 5.25-inch disc with a transfer program for 80-track users, and it's competitively priced at £9.95.

GRAPHICS



Graphics utilities for your screens

BBC/B/ B+/M/ C

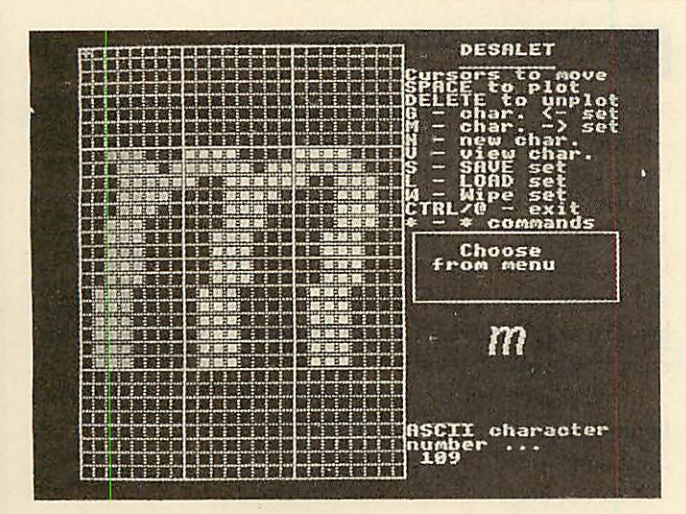
The 40-track 5.25-inch *Graphics Utilities* disc, keenly priced at £7.95, features 16 routines to manipulate blocks of graphics: rotation and reflection, a screen compressor/expander, a colour flood-fill routine and three mode conversion commands.

With the Basic procedure library are multi-height, proportional and justified text and 'drop shadow' boxes. A teletext screen editor gives point plotting, line drawing, rubber banding and flood fill, along with all mode 7 control codes. All can be used in your own programs.

Acorn User order form on page 133 – 24-hour telephone service (0672) 40825

OFFERS

C A L L I G R A P H Y



A new dimension in letter designing

BBC/B/B+/M This is your chance to produce your own letterheads and posters to a professional standard, with the minimum of fuss and effort. *Acorn User's Calligraphy* disc has been compiled due to popular demand and contains all the programs needed to produce letter designs that will impress your friends and colleagues.

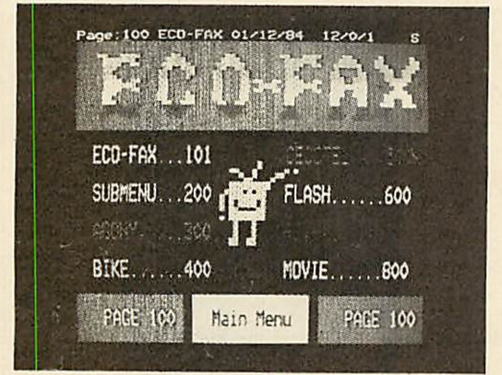
The *Desalet* program is a simple font creator which produces customised letters, to your personal design. It will save you from using repetitive data statements and error prone calculations. You can save your font set on disc and then call it up as needed. All previously saved sets can be modified or added to, and each set covers up to 94 characters.

Modical, a modification of the original *Calligraphy* program (*Acorn User* September 1986) is also included on the disc. *Modical* allows the use of disc-based font sets created with *Desalet*. *Modical* also incorporates a modified file creation program, which permits files to be printed out immediately or saved for later printing.

An enhanced font ROM in the form of a sideways RAM image, is also on the disc. This allows you to design your own fonts for use on-screen. Any output to the printer will be in the new font – thus giving true WYSIWYG capabilities. There is a selection of new fonts to help you get started.

This superb disc comes in 5.25-inch, 40/80-track format and is great value at only £9.95.

E D U C A T I O N

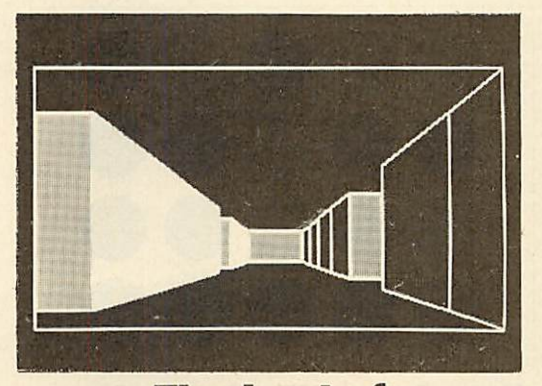


Easy learning with Education disc

BBC/B/B+/M/C The *Acorn User Education* disc makes learning easy and enjoyable. The disc is packed with useful programs, including the *Eco-fax* database for Econets.

Graphics are a strong feature, and included on the disc are *Turtle Logo*, *Easyplot* and *Bulletin*, and you can then show off your creations with *Vufoil* and *Noticeboard* or make music with *Tunemaker*. Also included are an all-mode dumping routine for Epson compatibles and a teletext dumping routine for mode 7 dumping to Epson FX80 compatibles. All this for only £7.95.

G A M E S



The best of Acorn User's games

Together on one cassette are the best games *Acorn User* has published. These include David Acton's *Spectromania* and *Quadline*. You can also puzzle over *Picture Slide*, get lost in the *3-D Maze*, be all at sea with *Run Silent Run Deep*, or collect apples in *Shuggy's Garden*.

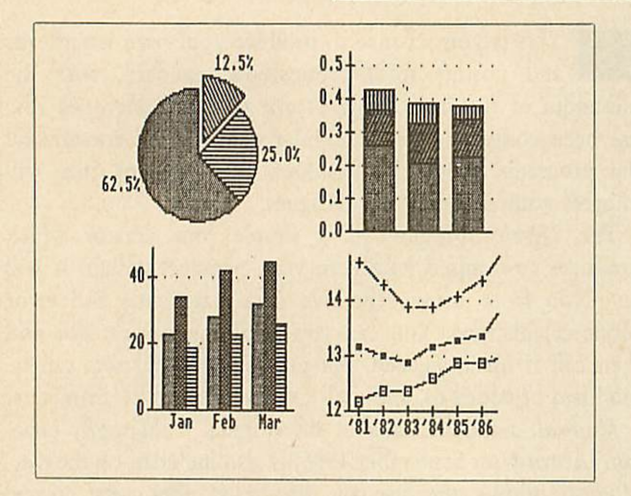
Try to work out a route round the *AU* office with Rob Anderson's adventure game.

This cassette is great value at only £3.95 and will work with BBC, Electron and Master machines. All the games are easily transferred to disc.

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OFFERS

CHART SOFTWARE



Improve your presentation with ViewChart

BBC/B/ B+/M/ C

Do you use your micro to prepare figures? Perhaps in *ViewSheet* or *ViewStore*? Do you make printed reports? This business graphics program from *Acorn User* contributor Peter Sandford is aimed at anyone who uses figures, and wishes to improve the quality of their work.

ViewChart takes your numeric data from a *ViewSheet* or *ViewStore* file, or manual input, and plots various chart formats to screen. In one plot you can produce between one and five piecharts, stacked bar charts up to 25 bars, grouped bar charts up to 24 bars and line graphs with up to five lines each of 40 plotted points.

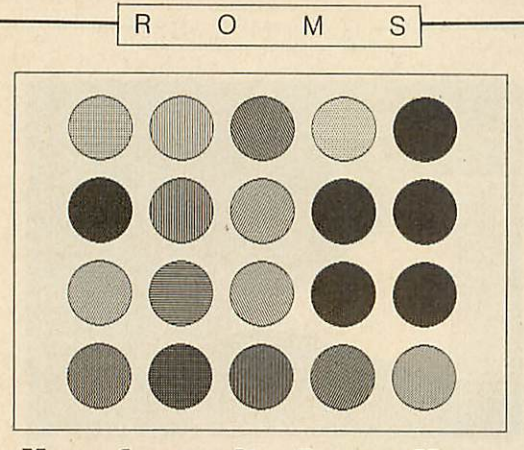
In practice, most business presentation data such as sales figures, departmental breakdowns, cost analyses and so on can be presented in a form even the boss will understand!

You can even add extra text and graphics to the completed chart prior to saving or printing. A screen dump program is provided, for Epson and compatible printers, which is specifically designed to fit the width of an A4 page. Instructions are provided on interfacing to other printers. *ViewChart* works in screen mode 0, using full shading effects, so what you see on screen is what you get on paper, and includes some tips on final presentation of graphics in documents.

ViewChart is supplied on 40-track 5.25-inch disc and works on the BBC models B and B+ and Master 128.

And the price of this professional software? Just £12.95.

ROMS



Your favourite Acorn User routines

BBC/B/ B+/M/ C/E

Get *UserROM* for your favourite *Acorn User* routines. Plug in the ROM chip and 19 routines are instantly accessible via star commands, including colfill with 27 colourful fills; dotfill providing 23 new black and white shades; bad program recovery; variable lister; function key lister; a graphics compiler; a circle drawing routine and a sound compiler. There are many demonstration programs and a 22 page manual. All for £19.95.

Full details are available from Seran, Redwood Publishing Ltd., 20-26 Brunswick Place, London N1 6DJ.

ROMS



UserDump for perfect screen dumps at £19.95

BBC/B/ B+/M/ C/E

The UserDump will allow you to dump any screen image in any display mode by entering a single command – either as a line of your program or by typing in direct from the keyboard. A perfect dump can also be obtained while a machine code program is running.

UserDump can dump a graphics window, a distortion-free dump of mode 0 screens using plotter graphics, translate teletext screen into mode 1, and shift any area of memory.

UserDump will work with any Epson-compatible printer. Write for further details to Seran (address opposite).

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REVIEWS

THE GAMES PAGE

OUT OF THE ARC

Superior has announced a BBC micro version of *Zarch*. Dave Lawrence reports on this and the rest of the games news

If you are one of the many BBC owners who have seen *Zarch* but can only ever dream about buying an Archimedes, then the time of waiting is over. Superior Software has announced the near impossible – *Zarch* on the Beeb! The game is going through its final testing. I have played 'Version 0.7' and although there is no sound yet, it seems to be nearly complete.

On the technical side, MD Richard Hansen explained that advanced display chip programming coupled with time-critical NMI routines has produced the 'mode in mode' screen. *Zarch* uses a small control area of mode 1 for the actual 3-D display, surrounded by mode 4 for the score and lives display. This gives vast memory savings, but still leaves space on screen for the less important items of information. It also reduces the number of calculations required for the 3-D display. Obviously, the Beeb cannot display the range of colours used in the full Archimedes version, but stippling and dithered colours are used to depict the landscape and ships.



An innovative split-mode screen allows *Zarch* to run on the BBC – but only with sideways RAM

On a BBC B, at least one bank of sideways RAM is needed. The disc is accessed fairly frequently. Master owners can remove the game disc after loading, as all the data is stored in sideways RAM banks and shadow RAM. The game should be out by mid-May. Sadly, there is no tape version and Electron owners will have to wait until the end of the year. It should cost £17.95 (£19.95 for the Compact).

Mirrorsoft should have a new game out much sooner than this – the BBC micro version of *Tetris* is due any day. Playing this is not the graphically stunning experience that *Zarch* is; no action graphics, no sound to gasp at, not even a background of twinkling stars.

Tetris is a difficult game of strategy. There are five different shapes you can make from four little squares – a bigger square, an L-shape, an S-shape, a T-shape and an I-shape. Random selections of these rain slowly down the screen into the playing area, and you have to manoeuvre them carefully as they fall to form a single solid block at the bottom of the screen, rather than a random pile of 'rubble' with holes in it that usually results. Points are awarded for the solidity of your pile of blocks. Simple and original.

A great deal of interest has surrounded this game, partly because it's claimed to be the first Russian computer game released in the West. It was written by Vagim Gerasimov and Alexei Paszitnov at Moscow University and the Soviet Academy of Scientists. Discovered in a research laboratory in Hungary by Andromeda Software, the game's distribution has been taken on by Mirrorsoft. In the past, BBC versions of Mirrorsoft games like *Spitfire 40* have been released months later than those for other machines, but *Tetris* is being released nearly simultaneously on everything from a Spectrum to the IBM PC. There's an enhanced version on the way from the USA, and it would be an easy job to convert to the Arc.

Reading-based Audiogenic has been quiet for the last few months, following the recent departure of Daryl Still to budget label Top Ten, and soured relations with its regular programmers. But it now has a complete new game up its sleeve, *Guildmaster,* and a few other ideas in preparation. *Guildmaster* is a maze adventure game very similar to *Ravenskull.*

Tynesoft is planning two new games – *Saigon* is a '*Commando*-style but better' game aimed at the shoot-'em-up fraternity, and there's also *Boulderdash.* According to Tynesoft, this re-released game is 'what Superior based *Repton* on'.

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MEGA-3 ROM

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CAN YOU FEEL THE FORCE?



Star Wars; Domark; BBC B, B+, Master; £9.95 (cassette), £12.95 (disc)

At long last, one of the most famous arcade games of all has been converted for the BBC computer. Domark has teamed up with game originator Atari to produce its version of the classic game.

Gameplay is divided into three parts. First comes the dogfight, in which you must destroy the approaching Tie fighters (representing the Empire) while avoiding their missiles. Then comes the flight through the towers, where you must fly over the surface of the Death Star avoiding the ground defence lasers. Finally, you fly along the Death Star's now famous trench and plant a missile in its exhaust port, destroying it.

The original arcade machine was launched several years ago, at the time when line graphics were fashionable. The game had wire-frame ships and scenery, digitised speech and a 'sit-in' console. The BBC version manages to emulate the graphics quite well, although a great deal of imagination is required with the other features!

The games graphics are in mode 5, giving four colours and quite chunky blobs. Movement is smooth and impressively fast, although things slow up a bit when there is a lot of action on the screen. Sound, although simple, is just adequate for the game. Lasers 'zap' and explosions explode in a distinctly *Defender*-ish manner.

Although the objectives of the game are simple, it keeps the adrenalin flowing and so keeps the player returning for another go. With a standard price of £9.95, I would recommend *Star Wars* to any arcade fan. If you are a George Lucas film fan, you should also keep a look out for the two sequels, *The Empire Strikes Back* and *Return of the Jedi*, promised for release later in the year.

Robert Miller

WHEN A PLAN COMES TOGETHER

Plan B2; Bug Byte; BBC, Master, Electron; £1.99 (cassette)

Plan B2 is a new game from Bug Byte – the follow up to *Plan B*. You are back in charge of a cute little R2D2 clone. Your job, to explore the Togrian computer complex, and destroy the computer parts within it. This is not an easy task because you have security robots trying to stop you at any cost. I haven't managed it yet, but I keep going back for another try. I looked at the Electron version, but the game is the same on the BBC micro.

Plan B2 is controlled using the keyboard and the controls are easy to master, but unfortunately there is no joystick option. You start the game in the teleporter room, where there is a barrier you can shoot down. When you are playing the game you collect the keys that you find lying around, which can be used to open doors in the complex.

You only have one life, but you do have some shields to protect you. If you collide with robots patrolling the area or one of their laser blasts hits you, then your shields are slowly drained. You may also run out of ammunition, but you can replenish your stocks as you go through the game. If you collect oil cans or spanners they will regenerate your shields.

Like its predecessor, *Plan B2* is a black and white only game, due to the BBC micro's lack of memory. But it does have big sprites which are very detailed and the sprite movement is quite smooth even on the Electron version. Unlike many games these days, there's no music, but the remaining sound effects are good, realistic 'explosion' noises.

The game was programed by Andrew Foord and it should do well. It is available for the BBC B, Master and Electron and at only £1.99 it is very good value for money. I liked it.

Richard Cusack

SOUL SEARCHING

Village of Lost Souls; Robico; BBC B, B+, Master, Compact, Electron; £9.95 (cassette), £12.95 (5.25-inch disc), £13.95 (3.5-inch disc)

After the success of their 'Rick Hanson' adventure games, Robico have embarked on another trilogy entitled *The Realm of Chaos*. Part one – *Village of Lost Souls* – finds you in the shoes of Nathan, the novice cleric. Your quest is to search out the infamous occultist Rhys Belroth, Lord–Talent of Dinham.

Starting from a mysterious ring of stones, you must explore the countryside and the nearby village of Dinham.

Movement through the land is relatively easy, with plenty of intriguing locations to explore before encountering any dead–ends. As with any adventure, it is advisable to map the land. This can be difficult, as the locations don't necessarily fit together as their compass bearings suggest. Humour traditionally plays a big part in a good adventure and this is no exception. Comments vary from the foolish and inane to the downright sarcastic. On examining the habit in which you are dressed, it turns out that 'It is a dirty habit'! The disc version of the game contains several 'enhancements' over the tape. One particularly good feature allows you to load or save your current position to or from a buffer in memory – no awkward changing of discs. Finally, the addition of 'WHAT', 'WHERE' and 'WHO AM I?', gives you an explanation of who you are and what you must do. By using 'WHERE' with the name of an object, its location can be discovered. One word of warning; knowing the location of an object and knowing how to get there are different matters!

With a definite slump in the release of adventures over the last few months, it is a relief to find a software house producing consistently first–class games. Although the current trend is towards 'graphic adventures', I find that text–only games can be just as much fun and often more imaginative. *Village of Lost Souls* definitely falls into this category and is a must for any 'traditional' adventurer.

Robert Miller

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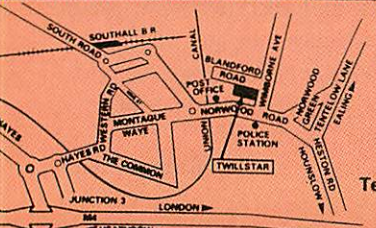
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BBC BASIC ON THE MAC

Executives can now run BBC programs on their favourite office toy. Chris Adie asks if BBC Basic has the power to succeed

BBC Basic is catching on! There's already a version for the IBM PC from M-Tec, and now Human-Computer Interface Ltd have produced a BBC Basic interpreter for the Apple Macintosh.

At £201, it comes on a single Mac disc, along with 14 example programs and a 174-page manual.

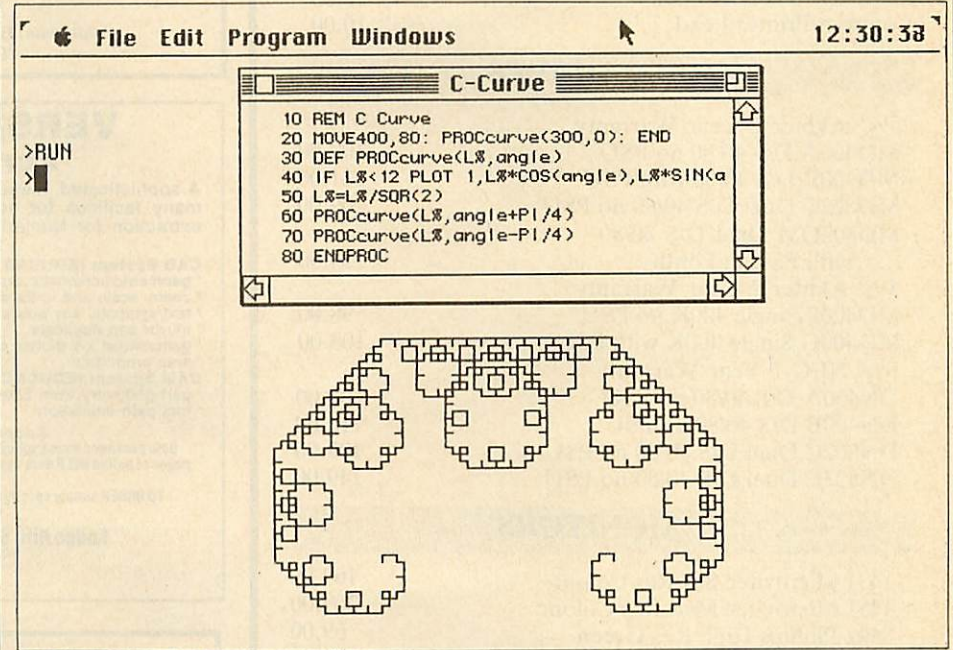
Basic uses two 'windows' – a normal Macintosh one called the edit window, where the program text appears, and a 'graphics' window, which is the entire Mac screen excepting the menu bar at the top. The graphics window is where all the program output appears, but it can also be used to give Basic commands. Clicking the mouse in it causes the cursor to appear beside a > prompt, and you can type commands such as LIST or RUN, or Basic statements for immediate execution.

Editing a program is best done in the edit window, where the usual Macintosh editing features enable you to select lines, cut, copy to the clipboard, or paste it somewhere else.

Transferring an existing program from a BBC micro to the Macintosh just requires a cable, available from HCI, to connect their two serial ports. But no way of transferring data files is provided – you would have to use terminal software like *Kermit* on both machines.

You can run a program by typing RUN in the graphics window, or by selecting 'Run' from the 'Program' menu. Unfortunately the edit window, which appears on top of the graphics window, does not disappear when you run the program – you must explicitly hide it by selecting the 'Editor' option from the 'Windows' menu. In practice, these menu options have single-keystroke alternatives, so hiding the window and running the program is simply a matter of typing Command-E followed by Command-R. The use of Command-E causes a difficulty – you can't change discs at all easily.

This implementation of BBC Basic claims to be largely compatible with the Master's Basic 4, with several useful features from Basic 5, for example CASE and



The program listing has its own window.

RECTANGLE. But – and it's a big but – it does not support star commands or other operating system calls, machine code, CALL and USR, ENVELOPE or ADVAL. So many programs won't run. Nor is there any way for a program to use the mouse or windows.

Mac Basic emulates the standard BBC screen modes, and also has a 'native' mode of 514 by 324 pixels. This mode is probably best for developing new programs.

The standard Mac is a monochrome machine, so programs relying on colour won't run sensibly.

With the usual Mac font, the screen is 83 characters wide and 33 rows down, so even some text-only applications will run into trouble. However, it is possible to use a different font, point size or type style so you can create some very attractive screen displays. Nine point Monaco type gave me a screen display 85 columns by 27, near enough to the mode 0 screen. And of course the emulation screen modes properly scale the text as well as the graphics, so you can have 80 columns if necessary.

Using the latest *PCW* benchmarks, BBC Basic on the Mac SE clocks in at roughly the speed of a BBC Master. Number crunching is faster, but screen operations (text and graphics) are substantially slower on the Mac, particularly screen scrolling. Of course the more advanced Mac II is very much faster.

The manual is adequate, but occasionally inaccurate, and could be more detailed in some areas. Much of it is devoted to a description of the example programs. Some of them are interesting in their own right, but they don't tell us much about BBC Basic on the Macintosh!

Because BBC micro star commands and several other features are not available, converting programs from the BBC micro to the Mac will not be at all straightforward in most cases. Programs making no use of graphics or BBC-specific interfaces will be the easiest to move. This lack of compatibility is a major problem with the product. It is also over priced.

If you must have BBC Basic on your Macintosh, then be prepared for a lot of conversion work! The BBC micro remains the best machine to run BBC Basic.

BBC Basic for the Mac costs £201.25 is available from Second City Systems, 86 Holloway Head, Birmingham B1. Tel: 021-622 3375.

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SOFTWARE

LEADER OF THE PACK

Computer bridge can help you learn the game before taking on human competitors. Michael Leete makes the opening bid

Black Queen by BBC Soft is a bridge-playing companion to the successful and much revised chess program, *White Knight.* Both chess and bridge represent a formidable challenge to the programmer. The best computer chess programs are now reaching a surprisingly high standard and, given the right encouragement, computer bridge may yet attain an equivalent status. For the moment, I would place *Black Queen* at the lower end of club play and I doubt if the program will do as much as is claimed to improve a club player's game.

Nevertheless, bridge requires a great deal of practice and the confidence that comes from regular play. Since the computer is ready to represent three people at a moment's notice, this program has a place in any player's repertoire. For the beginner, and used in conjunction with a textbook, I think it will be both helpful and encouraging. In particular, *Black Queen* will help the beginner to pass through that awful stage where you cannot find partners because you are not good enough, and you cannot become good enough because you can't find partners.

BLACK QUEEN



Contract Bridge Software for the BBC B, B+ and Master 128

In addition to playing the usual random deals, it is possible to constuct a deal from a book or newspaper and see how the play turns out. But it is not possible to force the computer to play particular cards so that a hand may be partly played in accordance with a given example. Any deal may be saved to the disc, and the game bid and played again to try out alternative contracts. Also, all four hands may be displayed and reviewed before playing the same cards again in the usual way.

At first sight, the graphics of the card table are rather primitive, because the mode 5 screen produces text that is too large and clumsy for the cards. The cards themselves are square, rather than oblong, and have suit symbols with a continental appearance. This brought back memories of a Paris bridge club when I lost a month's salary in one evening!

The only other bridge program that I have seen for the Acorn range of computers is *Bridge Mentor II* from Minic Business Services, where the screen display is very neat and card movements are accompanied by a distinctive 'card noise'. In *Black Queen* there is no sound at all, and the displayed hands are re-drawn after each card is played. This is as irritating as sitting opposite someone who continually re-orders their hand. In all other respects *Bridge Mentor* and *Black Queen* are designed for different purposes, but I have a personal preference for the flexibility of *Black Queen* because it leaves you to play your cards exactly as you please, without questioning your selection. That is, it makes no attempt to act as your 'mentor'.

The bidding from the computer takes place instantaneously, but the slow speed of card play would leave a club player standing by the tea-trolley without a partner. The bidding conventions used are outlined in the instructions, amounting to 'a system akin to Acol' incorporating 'a shortened form of the Blackwood convention for slam bidding'. The computer of course is immaculately consistent, but an outrageous opening bid can throw it into confusion, and your opponents make an unattainable contract. I also noticed that your computer partner can occasionally make a surprising response during bidding so that a less than satisfactory contract is made.

Inevitably the computer plays its hands in a certain way and you soon learn how it behaves, for example, in playing aces or drawing trumps. On the whole, play is fair but it is not difficult to predict.

When the game is finished, the score is computed in the traditional format and you have the options of playing the same hand again, looking at all the cards or going on to a new deal to complete the rubber.

I liked and enjoyed *Black Queen.* The defects I found should not be exaggerated. The game is playable as it stands and, up to a certain level of play around the lower club standard, will give useful opposition and practice. If you like playing cards but you are not an expert, I recommend you buy the game and send your comments to the publishers. My guess is that constructive criticism will be welcomed.

Black Queen for the BBC B, B+ Master and Compact. BBC Software, 80 Wood Lane, London W12 0TT. Cost: 5.25-inch disc, £14.95; 3.5-inch disc, £19.95.

SYMBOLS FOR SCIENCE

Sciways lets you use scientific and mathematical symbols in your usual wordprocessor. Dave Futcher makes the equation

Since its invention, the BBC micro has been widely used in scientific and technical work. But one of its major disadvantages is that scientific and mathematical characters cannot be easily added to documents with the usual wordprocessors.

If you wanted to do much more than place the simple formula for the area of a circle (πr^2) or the chemical formula for water (H_2O) in your wordprocessed text, you would find it very hard work.

$$\text{As } a \to \infty \quad 1 \div a \to 0$$
$$\sim(A \vee B) \equiv \sim A \wedge \sim B$$
$$a^2 = b \iff a = \pm\sqrt{b}$$
$$|\alpha| \geqslant 1 \Rightarrow \alpha \geqslant 1 \text{ or } \alpha \leqslant -1$$
$$1 \div x \ll 1 \Leftarrow x \gg 1$$

Figure 1. Some of _Sciways'_ symbols

Meyhew Telonics has come up with software to help you if you are stuck with a lack of scientific symbols.

It took Cambridge student Nick Mayhew nearly two years to produce *Sciways*. *Sciways* is a 16k ROM that provides all the special characters you need for scientific, mathematical and statistical work. In fact, it offers over 350 newly-defined characters, plus the facility to define an extra 26 of your own.

Every character you could wish for is included – integration signs, boolean and set characters, chemical characters, and two complete Greek alphabets.

In addition, a set of files covering extra European language characters is provided.

Sciways is designed for all Epson and compatible printers. The minimum necessary bit image code is ESC "L" (double density graphics), which doesn't rule out many models – it even works with the Epson MX III series. The package certainly works excellently on my FX100. I also checked it on an LX86, Kaga 810 and a Shiwa CP80.

Using the characters

If you normally use *Wordwise*, *Wordwise Plus*, or *View* (except version 1.4) for creating your text, you will find that *Sciways* is very easy to use. But it won't work with *InterWord*!

All the characters that *Sciways* offers are obtained with a combination of two characters. The first of these is called the 'prefix'. These prefix characters are: !, #, $, % and &. For example, ! is used to access the Greek letters and # is used to access the scientific characters. The second character decides on which actual character out of the set defined by the prefix is printed.

But what makes the *Sciways* so good to use is that the special characters are shown on the screen when text is previewed in *Wordwise Plus* or *View*. It is great being able to see what you are going to get before you print it, especially as some of the tall integrate and matrix bracket characters have to be built up in sections over a number of vertical lines.

$$\int_0^{2\pi} \theta^2 \quad d\theta$$
$$T = 2\pi \sqrt{\frac{1}{g}}$$
$$\oint B.\cos\theta \quad dl \quad = \mu_0 I$$

Figure 2. Symbols stretch over several lines

Before any of the characters can be printed, the character replacement routine has to be turned on with *CHON.

Scientific characters

Over 80 scientific characters are supported by the *Sciways* ROM. Some are shown in figures 1 to 3.

There are plenty of chemical characters including the cell diagram symbol and the parts of benzene ring. The general mathematical characters cover vectors, approximates, angles, roots and simple fractions. There is a very full collection of boolean and set characters too, and all the brackets you need. The scientific characters also have some general symbols, with arrows and even a copyright sign.

All of the scientific symbols are accessed with the # (hash) sign which is then followed by an ASCII character. So to obtain the infinity sign you would type in #o which would print ∞, or to print the sign for a universal set you would type in #E, which would print ε. Other symbols are shown in figure 2. *Sciways* also supports the full Greek alphabet, in upper and lower case and both upright and italic styles. This is particularly helpful for anyone involved in mathematical and statistical work. So if you need the signs for the population mean, the population standard deviation or the population product moment correlation coefficient, one of the Greek alphabets will cover it!

All the Greek letters can be used in conjunction with other scientific characters, in the same expression. There is no problem with an expression such as $[\alpha+\beta]$.

Constructing brackets

Another good feature is the facility for constructing brackets and similar symbols such as the integration sign in figure 2. Seventeen segments are available for the construction of such compound characters. These can also be used to print simple boxes and grids. Anyone who wants to use their wordprocessor for simple form design will find this really useful.

Sub and superscripts

Although all Epson-compatible printers have super and subscripting, it can be quite a difficult feature to control, particularly the frequent switching on and off required for scientific notation.

As such characters are important, *Sciways* provides very simple access. The percentage sign prefixes superscript, and the ampersand subscripts, so – x%2 will give x^2 and e%(%2%x%) will give $e^{(2x)}$.

User definable characters

Whatever *Sciways* provides, there will always be some characters you want which are missing. So it allows for up to 26 new ones to be created with the definer program supplied on disc. The definitions can be saved to disc and reloaded when required.

Also on disc is a full set of accented characters for most European languages.

As well as the excellent characters, the *Sciways* ROM also contains a very easy to use printer driver that provide very easy access to the main printer type styles. This time, style changes are prefixed by @: @C turns condensed on and @D turns condensed off; @I turns italic on and @J turns italic off.

In *Wordwise Plus* this avoids using some of the usual embedded sequences. In *View* it replaces the use of highlights.

As you would expect with a package of this type, it is accompanied by a comprehensive manual with many examples showing exactly how the characters and functions should be used.

The bottom line

The *Sciways* ROM is a first class piece of software. It has been very well thought out by its author. Anyone involved in scientific or technical writing with a BBC micro cannot afford to be without it! *Sciways* will put an end to having to add handwritten scientific symbols to wordprocessed text, or the painstaking construction of user-defined characters. But there are a few drawbacks. Inevitably, the inclusion of characters which take up two places 'on screen' but only one on paper ruins any justified text layout. This isn't serious for most applications though. More serious is that the compound characters – brackets, boxes, integrals and so on don't work properly on the 24–pin Epson printers. This is because the set line pitch command – ESC "3"n – works with different units, 60ths of an inch rather than 216ths. The brackets and other vertical lines appear with gaps in them, as in figure 4.

Figure 3. More useful symbols

This aside, *Sciways* coupled with *View* or *Wordwise* can be used as a scientific wordprocessor easily, reliably and cheaply and it can vastly improve the quality of your wordprocessed reports and theses.

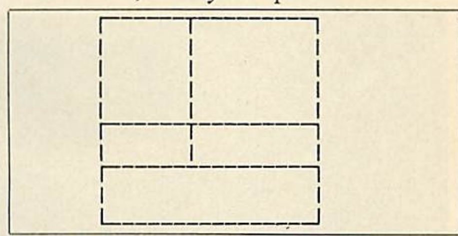


Figure 4. Gappy print out from 24-pins

The Sciways *ROM from Mayhew Telonics, 376a Ringwood Road, Poole, Dorset BH12 3LT. It costs £39.95 including VAT. Tel. (0202) 747695*

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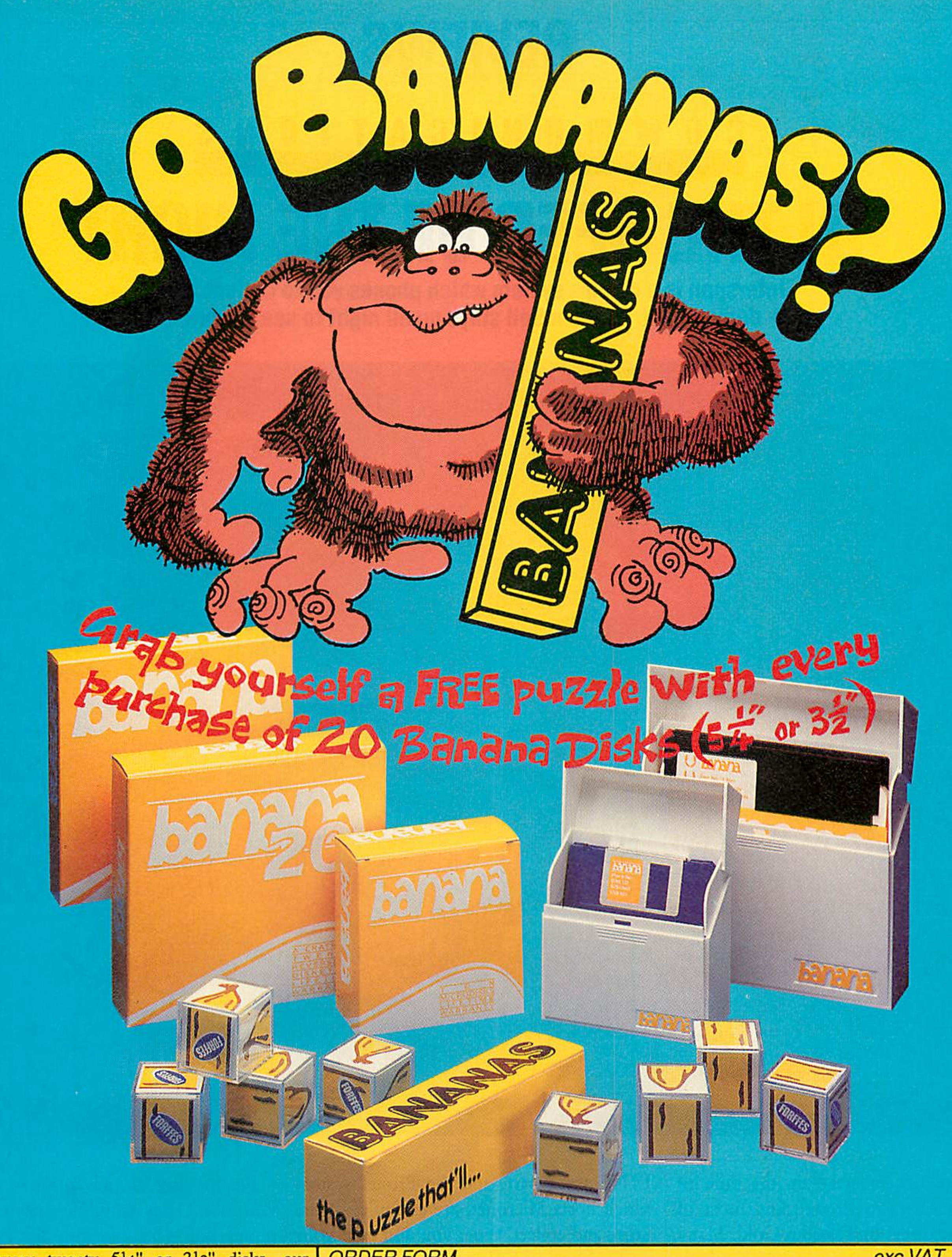
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COMMUNICATIONS

IN THE DEEP OF THE NIGHT

Interspan is a comms system which phones you to collect and deliver mail. Graham Bell stays up all night to see it work



ILLUSTRATION BY ROBIN HARRIS

BBC micro owners make up the bulk of home subscribers to Prestel, and most of the domestic users of Telecom Gold. Many readers will be familiar with them, perhaps not directly but because they host Micronet and MicroLink. Both offer a database service – up-to-date information displayed on your screen. Both offer electronic mail too, so you can send letters to other subscribers on the system.

Like real letter deliveries, electronic mail systems fall into two categories. First, there are the sort where you have to collect your letters from a Post Office box. These are called 'store and collect' messaging systems. Then there are the systems where letters are actually delivered to your door – these are 'store and forward' systems.

Telecom Gold, of which MicroLink and TTNS are a part, and the Prestel system which hosts Micronet, are examples of the 'store and collect' type: you don't get your mail unless you log on and collect it yourself. In contrast, Interspan delivers mail direct to your desk – and you don't need to do anything except leave your micro running and connected to the modem overnight.

What makes Interspan different from Telecom Gold and Prestel is that the Interspan central computer phones your computer every night. The program running on your micro answers the phone and Interspan collects all the messages you want to send. After ringing every subscriber and collecting all the mail, the central computer sorts all the messages and then rings everyone back to deliver their mail.

For the user, the advantage of this is that you don't pay anything extra on your phone bill – because you don't make any calls. All you need to do is connect your micro and modem up to the normal phone line during the night when it isn't used anyway. For Interspan, it's cheap because British Telecom offer a special licence for night use of the phone system – all the calls are made between midnight and 6am when the whole system would otherwise be idle.

All you pay for is registration and a charge on the amount of data you have transmitted. This makes it easy to predict and control the costs of mail – which is a vitally important consideration for many people. One problem with Telecom Gold is that you don't see the mounting costs of using the system until the end of the

quarter, when the phone bill arrives.

Interspan is X400-compatible. This means that it can be linked to other X400 systems like Telecom Gold and send mail to users on other systems. Many more people are reachable via Telecom Gold or Prestel, and there is already a gateway between them. For example, Prestel users can send messages to Telecom Gold subscribers. So potentially, you could use Interspan to send a message to someone with a mailbox on Telecom Gold. However, the gateways linking Interspan and the other systems together don't exist yet, so you are limited to those people on the Interspan directory. As yet, this list is short – around 40 people or organisations – but the list is growing. If you want to contact someone who isn't on the list, then you can't use Interspan.

For home users, there is also the problem of the modem. The vast majority of modems sold now are 'Hayes-compatible' devices. This means that they respond to a standard set of commands from your micro, instructing them to do things like dial a number or change baud rate. But most modems sold in Britain have the ability to work at 1200/75 baud – the usual Prestel standard. This split rate is an efficient method because Prestel usually sends you much more data than you send back. The Hayes standard doesn't use split baud rates, so each of the British manufacturers have adapted the standard differently.

Interspan doesn't support the use of Hayes modems, as it uses a split baud rate. It can deliver the mail quickly using the 1200/75 rate, but collecting your electronic mail at 75 baud would be too slow, so a 'reverse Prestel' 75/1200 rate is used. The unusual commands needed to switch from Prestel to reverse-Prestel means it currently only supports a few modems. One is the Tandata TM512 supplied to schools under the DTI scheme, and also distributed through TTNS. The Communitel modem also has the same command set. If you don't have this type of modem, then Interspan isn't for you.

Interspan's software is built around two files, which you keep on either disc or Econet. These are the in tray and the out tray. Items you want to send are put into the out tray, and the Interspan central computer collects them from there. Delivered items are put into your in tray.

The Interspan software consists of a Send program that allow you to put either ordinary text files or even programs into the out tray, and another Read program to collect the delivered files from the in tray.

Sending a message at first seems complex. You have to make entries on screen for the addressee's name and address. The address is taken from the Interspan directory. You can select whether you need confirmation of delivery – as with telex, you can be informed when a message is delivered successfully. All this data is added to separate forms on screen; each form is called up with a different function key. This process needs to be simplified.

COSTS

	Micronet	MicroLink	Interspan
One year's subscription	£66	£41	£90
Connection charge	0-6p/min	3.5-11p/min	—
Data charge	—	—	2p/k
Phone charge	0.7-4.4p/min	0.7-4.4p/min	—

You can also add a header to the message. This is vital, as you can send not just text but also program files, ROM images, or any other form of binary data. Interspan copes easily with Basic programs, *Wordwise* or *View* files. Unlike Telecom Gold or Prestel, there is no need to convert everything to plain ASCII text before transmission. The header should be used as a 'caption', to remind the recipient what sort of data the message is. There's also a separate 'private' header which you can add for your own use, which isn't sent as part of the message.

Finally, you can specify the file that contains the message. Alternatively, you can just type a short note into a basic wordprocessor called the Notepad.

The overnight transmission software is very easy to use – just boot the Interspan disc or run the program on the network, and leave it running. In the morning, press the Escape key to end the program.

Reading the items in the in tray is done with the *READ command. At first, a summary of the items recieved is displayed, with your name and the subject of the message. You can use the cursor keys to look through the list, and then print them, spool selected items or just read your mail on screen.

From the cost table, Prestel certainly looks cheaper at first sight, and for home users this may be so. But school hours mean use of Prestel incurs connection charges of 6p per minute as well as peak rate phone charges. Interspan subscription for a year costs £90 – expensive, but that includes £40 worth of free data transmission, which works out at about a megabyte of delivered mail. You may find that this is more data than you would use in a year; it works out at about three short messages a day. Beyond that, extra data is charged at 0.5p per 512 bytes. Each piece of mail is transmitted twice, once on collection, once on delivery, and the sender pays both charges. The minimum size for a message is effectively 1024 bytes, so the charge for a single short item would be 2p. The benefit of not having any phone charges to pay is, however, enormous.

Interspan is particularly appropriate for schools, because the costs are easily controlled and because the necessary modems are generally available. The Interspan software is suitable for use on an Econet network, and any person logged on can put mail into the central out tray and collect their mail from the in tray. Only the system manager need run the overnight software on a terminal attached to a modem. It is best if this terminal is protected from well-meaning staff who switch off machines as they leave work.

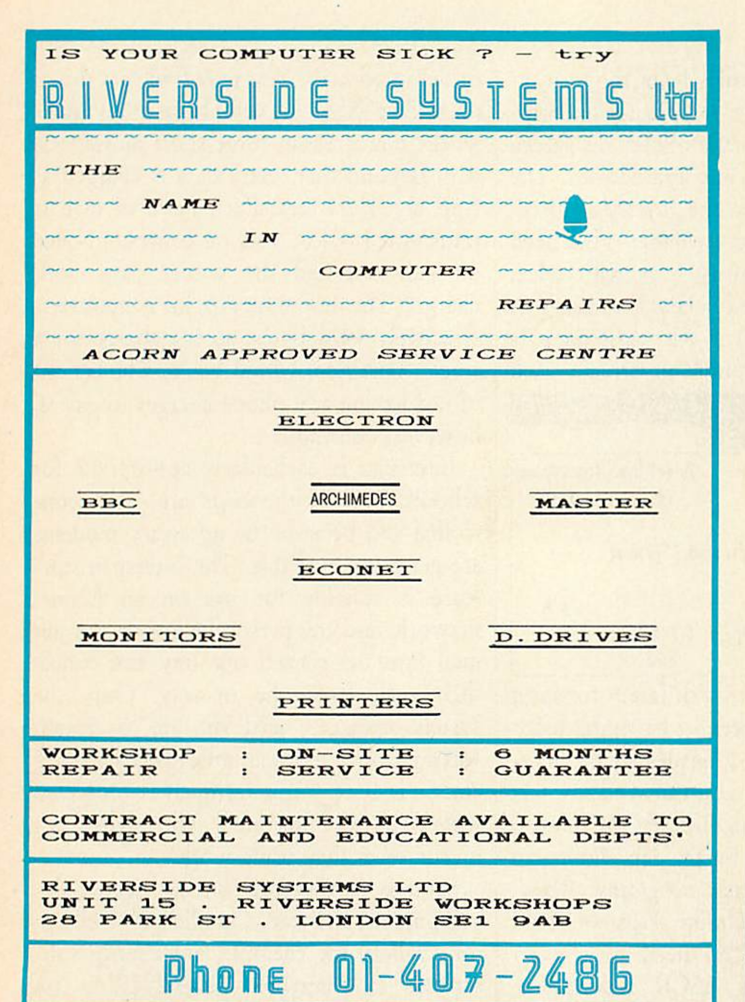
Schools at the forefront of Econet developments, Felstead, Oundle and Wellington College for example, are already subscribers to Interspan. Several LEAs are evaluating the system. Because of the ability to transmit files and even whole network directories, it is seen as a simple way of distributing licenced software to schools throughout a region.

To encourage this, Interspan intends to develop a cheaper 'second class' delivery system for non-urgent items. Overnight delivery would not be guaranteed but messages would be forwarded within a week, on nights when traffic is lightest.

Conferences are another possibility for the system. Here, subscribers join a group, and any mail sent to the group is delivered to all its members. Members of the conference pay for mail they receive. Conferences could be set up for people with shared special interests.

Interspan is a workable and convenient alternative to the established forms of electronic mail. It makes good use of existing resources, and is noticeably cheaper. The disadvantages of Prestel and Telecom Gold with respect to data files are overcome completely. The Interspan subscriber list is short, but if you regularly communicate with a small group of people, or if you regularly send discs full of programs to colleagues, then Interspan may be the system for you.

Interspan Ltd, Intercell, 1 Coldhams Lane, Cambridge CB1 3EP. Tel: (0223) 461426



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London. Association of Computer Clubs: Rupert Steele, 12 Philbeach Gardens, London SW5 9DY
London. Radio Amateur Micro User Group: contact by bulletin board No 86300198
East London. SOBAT Computer Club: Mr T A Kayani, 12 Calderon Road, London E11
Tel: 01-556 5423
North London. BBC Micro Users Group: Mr Ric Keyworth, 'The Penthouse', 4b Kilburn High Road, London NW6 5UL
Tel: 01-734 9235
North London. North London BBC Micro User Group: 82 Hornsey Lane, London N6 5LU
Tel: 01-263 6760 (eves)
Wandsworth. Wandsworth Computer Club: C Kendrick, Earlsfield Library, Magdalen Road, London SW16
West London. Personal Computer Club: Chris, Tel: 01-743 1579;
Steve, Tel: 01-540 6271;
Blue, Tel: 01-579 5415

SOUTH-EAST

Aylesbury. BBC Micro User Group: Aston Clinton County Combined School, Twitchell Lane, Aston Clinton, Aylesbury, Bucks HP22 5JJ Tel: (0296) 630276
Billericay. New JP101 user group. Sae for details. JP101 User Group, 8 Gardens, Billericay, Essex CM12 0HA
Bognor Regis. Bognor Computer Group E R Piper, 2 Ely Gardens, Aldwick Park, Bognor Regis, Sussex PO21 3RY
Bracknell. Bracknell Primary Schools Computer Users Group: D Donaldson, Wildridings County Junior School, Netherton, Bracknell, Berks RG12 4DX
Brighton, Hove & District. Brighton, Hove & District Computer Club: J Smith, 30 Leicester Villas, Hove, E. Sussex BN3 5SQ
Bucks. South Bucks Acorn Computer Club: David Park, 160 White Hill, Chesham, Bucks HP5 1AZ
Tel: Chesham 783097
Camberley. Camberley Computer Users Club: David Crosby-Clarke
Tel: Crowthorne 771590
Prestel mailbox 344771590
Caterham. Computer Club: Caterham Leisure Centre, Godstone Road, Caterham, Surrey CR3 6RE
Guildford. West Surrey Computer Club: Jan Spencer, 52 Lindfield Gardens, Guildford, Surrey GU1 1TS
Tel: (0483) 63512
Harpenden. Harpenden Microcomputer Group: P Cowley,
36 Southdown Road, Harpenden,
Herts AL5 1PG
Harrow. Harrow Computer Group: Bazyle Butcher, 16 St Peter's Close, Bushey Heath, Watford WD2 3LG
Tel: 01-950 7068
Ilford. ILBUG: Peter Jones,
1 De Vere Gardens, Cranbrook, Ilford,
Essex IG1 3EB
Tel: 01-554 9825
Iver. Iver Computer Society: John Haigh, 11 Colliston Walk, Ford's Farm, Calcot, Reading, Berks RG3 5ZJ
Tel: (0734) 417534
North & Mid Essex. User Group (NAMEBUG): Andy Purkiss,
12 Palm Close, Witham, Essex
Tel: (0376) 515609.
Prestel: 376515609
Reading. Reading User Group (RUG): Richard Rowlands,
Tel: Reading 596825 (eves)
South East Essex. BBC User Group (SEEBUG): Mr A P Jordan, 97 Oakhurst Drive, Wickford, Essex SS12 0NW
Tel: Rayleigh 771428
Sutton. Sutton Library Computer Club: The Secretary, 21 Village Row, Sutton, Surrey SM2 6JZ
Tel: 01-642 3102
Welling. Computer Users Club: Tony Latham, 69 Hadlow Road, Welling, Kent DA16 1AX

SOUTH & SOUTH-WEST

Abingdon. The National Elf Service: The Elf, 18 Kings Avenue, Marcham, Abingdon, Oxon OX13 6QA
Alton. Alton Computer & Electronics Society: Kevin Weatherhead, Sheen, Old Odiham Road, Alton, Hants GU34 4BW
Tel: Alton 87478
Fareham. Porchester & Fareham Computer Club: Simon Ward, 9a East Cams Close, Downend, Fareham, Hants PO16 8RP
Gosport. Borough of Gosport BBC Users Group (BOGBUG): Graham Dubber, 128 Wych Lane, Gosport, Hants PO13 0TE
Tel: (0329) 282221 (evenings)

MIDLANDS & ANGLIA

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Burton-on-Trent. Beeb Users' Group (Bug Club): Mrs Linda Yeomans, 13 Regent Street, Church Gresley, Burton-on-Trent, Staffs DE11 9PL
Tel: (0283) 216445 (eves)
Cambridge. Bottisham Acorn User Group: Peter Rank,
Tel: Cambridge 812080, or Gerald Wilcockson, 19 Gallows Hill, Saffron Walden, Essex CB11 4DA
Tel: Saffron Walden 23793
Derby. The Derby Microcomputer Society: F Taylor, Secretary, c/o 5 Park View Close, Allestree, Derby DE3 2GH Tel: Derby 559334
Derby. Mrs B Bowman, 6 Shady Grove, Hilton, Derbyshire DE6 5PX. Tel: (028373) 2529
Dudley. Kingswinford BBC Micro Club: Kingswinford Community Centre, High Street, Kingswinford, Dudley, West Midlands
Tel: Dudley 212538
Glossop. Glossop Computer Club (Derbyshire): T S Fox, 4 Park Lane, Little Hayfield, Stockport, Cheshire SK12 5NW
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Tel: 818430
Stratford. Stratford Computer Club: Chris Parry, 15 Kipling Road, Stratford-on-Avon
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Sweden. BBC User Group: Anders Wichman, Folkungagatan 58, 11622 Stockholm
Sweden. Acorn User Society of Sweden: Tord Israelson, Tuppa Klaras Vag 12, S-702 29, Orebro, Sweden
Tasmania. BBC Users Group (Tasbeeb): Box 25 PO, North Hobart 7002

SPECIAL INTEREST

Accounts. BEEBACC: Brian Pain, 40a High Street, Stony Stratford, Milton Keynes
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Atom. Acorn Atom User Club: Kevin Roll, 66 Shaldon Drive, Morden, Surrey
Tel: 01-540 5282
Bulletin Boards. Forum 80: 421 Endike Lane, Hull HU6 8AG
CP/M. CP/M User Group: Diana Fordred, 72 Mill Road, Hawley, Dartford, Kent
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Electronics. Alton Computer & Electronics Society: Kevin Weatherhead, Sheen, Old Odiham Road, Alton, Hants GU34 4BW
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Heraldry Society. Colin Forrester, 5 Hook Road, Epsom, Surrey KT19 8TH
Logo. British Logo Users Group (BLUG): Richard Olney, c/o London Technology Network, 86-100 St Pancras Way, London WC1
MUSE. PO Box 43, Houghton on the Hill, Leicester LE7 9GX. Tel: (0533) 433839
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BBC B, disc drive, datacorder, SWR, joystick, desk, multitude of software, utilities and games. £400. Tel: (0942) 57523 eves.

ELECTRON, Plus 1, recorder, selection of games and manuals, excellent condition. £80 ono. Tel: 061 491 3942 eves.

SELLING complete BBC system, will split. Beeb, drives, ROMs etc Music 500 Pascal. For complete details or offers Tel: 01-505 5001.

ELECTRON Plus 1, Plus 3, *View*, *ViewSheet*, T2P3 ROMs, Acorn database disc. Recorder. 17 games including Repton. £175. Tel: (0652) 648595.

BBC B Acorn DFS, SW RAM, 40/80T drive, monitor, teletext adaptor, joystick, 20 software discs, all £400. Tel: (0628) 30099.

ACORN BBC B 32k, Opus disc drive and filing system, joystick. £200 ono. Tel: (0672) 62296. Ask for Jo.

ELECTRON with Plus 3, manuals, mags, software worth £300, only £230. Dave Cohen, Mont's, Felsted School, Dunmow, Essex CM6 3JG.

AKHTER MD400A drive £80, Olivetti JP101 ink jet printer £50, both new. Tel: Folkestone (0303) 43210 eves.

SOLIDISK 1770 DDFS, S/W RAM 32k, games, magazines (*Micro User* and *Acorn User*). £130. Tel: 091 489 6663, weekends, ask for Paul.

ELECTRON Plus 1 with second processor, Cumana disc, interface, *Commstar*, RS232, *View*, Toolkit T2CU Addcomm ROM box, loads of software, offers. Tel: (0670) 367429.

BBC micro, DFS/ADFS Aries B32/B12 combination, assorted ROMs, manuals. Tel: Basildon (0268) 763171, office hours only.

MASTER Compact colour system, Centronics printer, manuals, books magazines. £525 ono. Tel: John (0533) 366344 eves.

FOR SALE: 30 of 2708 EPROMS. (No splitting). £80 ono. Tel: 01-940 5635 between 5 – 9pm.

TORCH Z80, MCP 0.41, perfect software with manuals. CP/M for BBC B. £100. Tel: Dolgellau 423 026 eves.

BBC B, good condition, new colour monitor, DFS speech synth, disc drive, joystick desk. £440 ono. Tel: (0604) 858 202.

64k Acorn Electron turbo. Recorder, *View*, *ViewSheet*, books, games (inc. *Colossus*, *Chess*, *Mini Office*), magazines. £95. Tel: 01-427 1838 (Harrow).

LOGOTRON Logo ROM and extension disc £30 o.n.o. Wanted AMX MkIII Mouse, swap? Tel: (0737) 833128 eves.

BBC B 1.2 OS free ROMs £200, challenger 1770 DS/DD 40/80T + 512k RAM £175 Centronics 730/1 printer, £75, or all £400. Tel: (0786) 813 970.

ELECTRON with Plus 1, Slogger master RAM board, SEDFS, *View*, *ViewSheet*, T2SE DFS manuals, games, etc. £100. Tel: Burgess Hill (04446) 42826).

TRACKERBALL £30, linear graphics: Lincad, Linmap £25 each. Games (*Cholo*, *Repton3* etc), business software – half price: Tel: (0924) 840129 eves.

BBC B OS 1.2 Acorn DFS 32k SWR 100k 40/80 D. Drive med res green monitor, software. £365 ono. Tel: (0628) 75261.

ELECTRON Plus 3, 10 discs, PSU, manual, boxed, as new. £45 ono. 24 issues *Electron User*. £5. Tel: 051 608 9383.

ELECTRON. Plus 1, Plus 3, S/W RAM, ADFS/DFS, printer, colour RGB, Plus 5, mouse + software and mags. £550. Tel: Ian 4 – 5pm 061 794 2494.

DISC Drives, two, new. Epson and tec, 40T D/S, half height, £49 each. PSU available. Tel: (0734) 64271.

CUMANA dual 40/80T drives, own PSU £150, Acorn Z80 processor. £150, HCR ROM/RAM box holds 24 ROMs. £60. Modem £30. Tel: (04024) 74633.

BBC B dual 80/40T drives, PSU, 32k S/W RAM, mounted in Viglen console, software, joystick. £375. Tel: (0703) 840065.

OPUS challenger 256K disc drive. £100. *View*, *ViewSpell*, *Fleet Street Editor*, Logotron Logo. Tel: Phil, Exeter 76214 eves.

BBC B Acorn DFS including *Wordwise*, joystick, recorder and some games. £200 ono. Tel: (0706) 621832.

BBC B, 40/80T disc drive, AMX Mouse with *Super Art*, speech chip, Wordwise, music system, joystick, software, books. £280 ono. Tel: Epsom (03727) 20690.

BBC B OS 1.2 GUC DFS, AMX *Super Art*, *WW+ Dumpout3*, mouse MKIII, complete with manuals. £245. Tel: (0375) 678554.

BBC B computer 2½ years old, software, speech synthesiser with chip VGC. joysticks. £240. Tel: (0473) 86 624.

PRINTER stand, perspex 80 column £10 ono. Copy holder, angle poise style, fair cond £5 ono. Tel: (0329) 232139 eves.

BBC B, dual 40/80-track disc drive, Epson RX80 printer, ATPL ROM/RAM board, several ROMs (including *Wordwise+*), software, books. £450 ono. Tel: (09278) 3534.

MASTER 512, disc drive 40/80 teletext adapter, music 500, EPROM programmer, 10 27128s, 100 discs, many extras. £700. Tel: (0621) 53226.

CUMANA; CS 100 40T SS disc drive £70 ono. Tel: (0962) 880 134 eves.

ELECTRON Plus 1, Plus 3, T2P3, recorder, discs, tapes (2) ROMs, EU/AU & input mags, books. VGC. £200. Tel: (0245) 360724 eves.

ELECTRON Plus 3, ROMbox Plus, T2P3, mags, software, leads, books, discs, VGC. £200 ono. Tel: Loughborough (0509) 213123 after 7.00 pm.

BBC extras, *View 2.1* £20. *Wordwise* plus £20. Graphics ROM £7.50. Watford EPROMer £40. P-System for 6502 £50. Tel: (0532) 779050.

TORCH-Z80 second processor, complete with manuals & software. £200. Tel: (0865) 723670 (Adam) eves.

BBC B with drive, plus joystick, lightpen, books, magazines and lots of software. Sell for £300 ono. Tel: James (06284) 76184.

MASTER turbo, dual discs, Viglen console, Microvitec colour monitor, Kaga printer, AMX Mouse, manuals. £1000. Details/offers, Tel: Alan (0256) 464889.

MASTER 128 plus manuals. £300. 4096 colour upgrade. £350. DS 80T drive. £75 ono. Tel: 01-366 5881.

LINNET modem + *Commstar II* £160, new, unwanted present, still inside box. £135. Tel: 051 259 1475.

BEEBUGSOFT *Toolkit* ROM £12. Exmon II machine code monitor. £15. Excellent condition. Tel: (0296) 22184 eves.

ELECTRON with turbo driver, plus 1, recorder, software, books. £150. AUs and complete set *Electron User* – offers? Tel: 01-644 2861.

BBC B, monitor, Watford d/drive, £200 of software, £60 of books, disc boxes, joysticks, trolley. £350. Tel: Basildon (0268) 3768.

BBC B DFS 80 disc drive, 32k Solidisk RAM, Decwriter printer, 50+ discs, software. £310 ono. Tel: (0634) 669334.

BBC B, Watford ROM/RAM board, 6502 second processor, Cumana twin drives hi-res Cub colour monitor, mouse, books, software. £700. Tel: 040 22 20305.

BBC B with Econet, including Torch 280 dual D/S 80T drives, high resolution green monitor. £350. Tel: Leon (0582) 411440, Wednesday afternoon or Saturday.

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BBC B, single drive, Taxan KP 810 printer, Acorn DFS, *Wordwise*, *Disc Doctor*, manuals, books. Tel: Steve (0256) 26606.

BBC B 3 years, barely used, plus Saisho recorder DR10. Written offers. only. Clive Graham, Crossways, Main Rd, Rettenden, Chelmsford, Essex, CM3 8DY.

BBC B issue 7, OS 1.20, Watford DFS, excellent condition. £210. Tel: (0372) 58743.

ELECTRON, Plus 1, 64k, turbo, Master RAM board, ADFS disc drive, *View*, *ViewSheet*, *Starstore*, printer ROM, *dBASE*, discs. £250. Tel: Basingstoke 781439.

BBC B, Acorn DFS, DS/DD 40/80T drive, over £100 software, AMX Mouse and *Stop Press*, APTL board with 16k RAM 12 ROMs, *Wordwise Plus* and *Disc Doctor*. Cost £1100, sell £500 ono. Tel: Chelmsford (0245) 400338.

DISC drive, Cumana (Mitsubishi) 40 TSS. No PSU, boxed as new. £45. Offers. Tel: 021 355 5029.

CHEETAH sweet-talker speech ROM, complete with demonstrator cassette and instructions £15. Beebug magazines, volumes 3-5 excluding 3 no 4. £12. Tel: (0296) 22184 eves.

BBC B issue 7, Acorn DFS, Microvitec colour monitor, Acorn 800k drives, Juki 6100 printer, Prestel, joysticks, *View*, *ViewSheet*. £625. Tel: Romford (0708) 42953.

WANTED PSU and/or case for single/double 5.25-inch disc drive. Tel: Wolverhampton (0902) 333765.

WANTED BBC DFS with disc drive also printer if possible, will accept separate buys. Tel: Norwich (05086) 3517 eves.

WANTED tractor feed Brother M1009 printer. Lawden 6 Ashburn Park, Eglinton, Londonderry, N. Ireland, BT47 3AJ. Tel: (0504) 810370.

WANTED: BBC micro issue with all leads, good condition with DFS. Willing to pay £190. Tel: Plymtree (08847) 274.

WANTED ATPL SW+ board, spellchecker ROM, instructions, Wordwise+. 47 Clumber Drive, Gomersal Cleckheaton, BD19 4RP. Tel: 0274 875 217.

WANTED toy shocking coil, formerly sold with 4.5v torch battery and hand held. Electrodes please. Tel: 01-834 5856, 24 hours, Patrick.

WANTED: Tape drive or just connections to get tape to run on Master Compact. Tel: Gorebridge 031 49 22003 eves.

WANTED Acornsoft linkword French for BBC B, must be in good condition, reasonable price paid. Tel: 01-570 6933.

WANTED 'View' (manual unnecessary). Tel: (0532) 681768.

WANTED, Morley teletext adapter for BBC B. Tel: Peter, 021 351 2813 eves.

ELECTRON, Plus 1, Pascal, *View*, *ViewSheet*, Lisp, *Starship Command*, *Exmon*, *Image*, games tapes, books. Boxed as new. Offers? Tel: (Bedford) 58054 eves.

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Fill in the form below to a maximum of 20 words (one in each box) and send it to *Acorn User* Free Ads, 20-26 Brunswick Place, London N1 6DJ. Please use capital letters, write clearly, and remember your name, address and telephone number. Without this full information, supplied on a separate sheet of paper, we regret we cannot carry your Free Ad. We cannot accept entries selling or swapping software. This is a service to readers – no companies please. One entry per form only. Free Ads are carried in the magazine as space permits, and any Free Ads not used within a month of receipt will be disposed of.

ACORN USER'S DIARY

Too many cooks. . .

Acorn employs three separate public relations agencies to keep the press busy, plus its own internal people. The result has been a head-scratching Orson Fact and a series of confused press releases.

One agency, on the advice of our solicitors known only as the Quentin Bell Organisation, has distinguished itself with a series of well-timed missives. In one document, ace hack Orson Fact reads that 'over *one million* Archimedes machines have been sold since the series was launched in June *1988*'. It goes on to describe stalwart spreadsheet *Logistix* as 'a spreadsheet package developed by Acorn and marketed by Grafox'. Orson predicts that there will soon be only two agencies.

Another Orwellian source has supplied this 'spot the difference' competition (right). One (top) is captioned 'Trade and Industry Secretary Lord Young opens the *Which Computer?* Show. On his left is Acorn's new managing director, Harvey Coleman.' So Harvey is the fresh-faced lad holding the paper.

The second (bottom) is labelled 'Lord Young is shown the Archimedes by new managing director Harvey Coleman (left-hand side)'. This means Harvey must be the chap admiring the cut of Lord Young's suit. Hmm, perhaps just the one agency would be enough.

So is the new chief a spotty-tie man or a plain-tie man? Orson feels the public should be told. Will the real Harvey Coleman please stand up?



Above: Harvey Coleman (r). Below: Harvey Coleman (l)



Designs on Arc software

The Design Council – the one that puts the triangular tickets on designer corkscrews – has launched a set of awards for computer software packaging. It even saw fit to invite Orson to the celebratory lunch.

Orson was disappointed, though hardly surprised, to discover that no Arc programs were considered worthy of notice by the Design Council. So after brief consultation with *AU* team Orson has decided to launch the Acorn Abuser awards for Arc software packaging, otherwise to be known as the 'Tony'.

Nominations so far we Fairhurst Instruments for the yellow paper envelope containing *Arctist*, and Superior Software for the monochrome instruction booklet for the colour game *Zarch* (see picture above). Votes, further nominations and bribes should be forwarded to Orson, c/o Abuser.

Arthur arrives (again)

Acorn's customer services department has found a novel way to placate long-suffering Arc users. To reward them for their patience in waiting so long for a final, fully working version of Arthur, it has been sending out not one but two copies of the precious ROMs to some lucky owners.

However they have been spared the difficult problem of picking which set to install by the arrival of a duplicated note from Acorn pleading for the return of the spare set.

Blunderbox

Abuser regulars will have noticed that departed deputy editor Steve 'Fly Boy' Mansfield is not immortalised on this month's cover as promised, but was seen cleaning windows last month. You can, however, still catch a glimpse of him this month on page 89.

Quest

The Quest is under way

Making Sweet Music

Visiting the Elephant House

Battling through a Killer Horde

Leaping over Vats of Acid

Interrogating a Computer Terminal

Passing through Verdant Foliage

Going for a Swim?

ACID

Walter Cobra and the Quest for the Golden Dragon

You are Walter Cobra, a clever but absent-minded young lad who spends many hours indulging in two favourite hobbies: exploring, and inventing. One day, to your surprise, you stumble across a faded old map which indicates the route to a buried object marked as "The Golden Dragon". You recognise the starting-point on the map as being a wishing-well located a couple of miles away from your home. Full of anticipation, you decide to begin your quest the following day.

The next day, as the sun is rising you excitedly get out of bed, pack your rucksack with a few provisions, and then don your jet-boots — an astounding invention which enables you to fly for short periods of time. You amble over towards the wishing-well and slowly climb down the walls of the well. It's quite deep, but finally you reach the bottom. You then suddenly realise that you have left behind a very important item, the map.

You decide to press on regardless. You remember some of the places shown on the map: "The Music Room", "The Joke Shop", "The Chapel"; but, bearing in mind the size of the map, this quest will surely be the greatest challenge of your life!

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(Compatible with the BBC B, B+ and Master Series computers)

PRIZE COMPETITION

£100 is the first prize in our competition, with 20 congratulatory certificates for runners-up.
To enter the competition, you must locate the Golden Dragon, and write to us describing the final messages that you receive.
Closing Date: 30th June, 1988.





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